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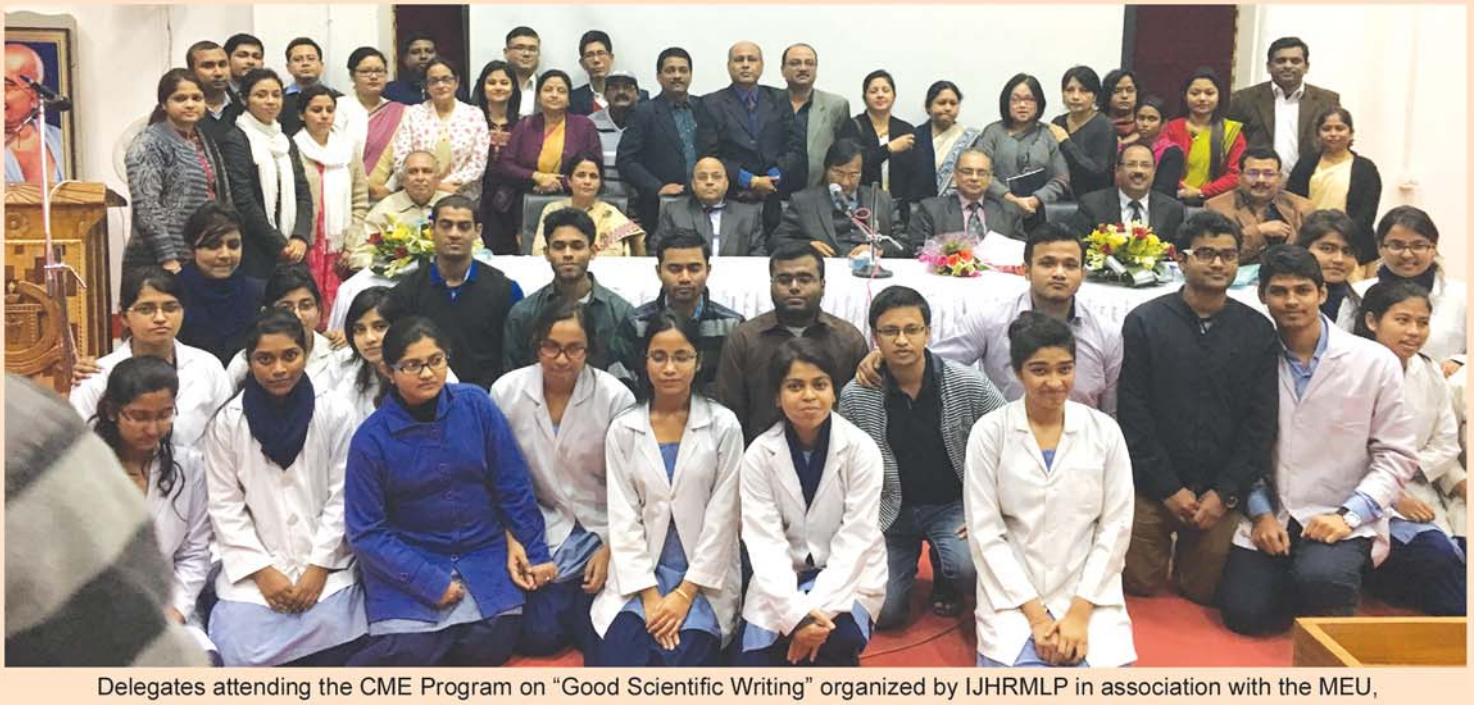

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Welcome to the "International Journal of Health Research and Medico Legal Practice (IJHRMLP)". **IJHRMLP** is published by **NECHURD** six monthly in January and July every year and a **peer-reviewed multidisciplinary indexed** journal. The journal has been assigned international standard serial number (ISSN) for both print (ISSN 2394–806X) and electronic (ISSN 2454-5139) version.

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EDITORIAL

PC-PNDT ACT: THE NEED OF THE HOUR

Hazarika Karuna*

The Government of India passed the Pre Conception and Pre-Natal Diagnostic Techniques (prohibition of sex Selection) (PC-PNDT) Act with the aim of preventing female foeticide on in 1994. The implementation of the Act was slowing rather almost nonexistent. There was further dip in child sex ratio in 2001 census and that leads to amendment of the Act and replaced in 2002 by Prenatal Diagnostic Techniques (Regulation and Prevention of Misuse) Act (The Act). It was effectively implemented in 2003 and amended further in 2011. The Act No 57 was enacted on September 20th 1994, with an aim to prohibit sex determination before birth and leading to female feticide there by to safeguard the girl child.

THEACT

Definition

"An act to provide for the prohibition of sex selection, before or after conception, and for regulation of prenatal diagnostic techniques for the purpose of detecting abnormalities or metabolic disorders or chromosomal abnormalities or certain congenital malformations or sex –linked disorders and for the prevention of their misuse for sex determination leading to female foeticide and for matters connected therewith or incidental thereto".[1]

The Act itself is draconian if you look in to the point of its effects on radiologist/sinologist.[2] The Act offers no escape to the erring physicians (radiologist, sonologist, gynecologist, geneticist, etc). At the same time it is very simple to abide by the Act. But, non-compliance of the Act in any form invites the penalty. There are many instances of penalization for either involvement of sex determination or non-maintenance of records.

Registration of Machines and Hospital, Diagnostic center, Genetic clinics, etc are mandatory under Section (18) the Act and also the written consent of the pregnant woman and prohibition of communicating the sex of fetus under Section 5 of the Act.

Maintenance of records as provided under Section 29 of the Act are required. Record keeping in revised form (F) and preservation of records for mandatory period of 2 years or till final disposal of cases (if a case is filed) in regardless of offences (invasive or non-invasive) with a ultrasound machine in a pregnant mother is also important.

The nature of the Act is essentially prohibiting sex selection, determination, disclosure and advertisement.

To create awareness amongst the public with the help of large board about the prohibition of sex determination and penalty of violation, etc. is to be kept in the premises.

The Implementing Authority and the Penalty

Unfortunate decline of sex ratio has brought the stringent measures like suspension of registration, filing of criminal cases, sealing of machines, etc. There is also suspension and cancellation of registration of physicians besides the criminal prosecution. There may be fine of Rs. 10,000/ and jail up to three years in first offence. On subsequent offence it may invite fine of Rs. 50,000/ and jail up to five years for the doctors apart from other penalty.

The implementing authority is the Appropriate Authority at the district, state and in union Territory level. **The level of management of the Act**: These are like central-level and state–level Supervisory Board, an **Appropriate Authority (AA)** and supporting Advisory Committee. The Supervisory Board is to observe, monitor, and make amendments to the provisions of The Act. The Appropriate Authority provides registration and conducts the administrative work including penalization of noncompliance. The Advisory Committee provides expert and technical support to the Appropriate Authority.[1] It is mandatory to have license to conduct such type of test in the Hospital, Diagnostic and Genetic clinics. The person conducting the test has to follow strict code of conduct laid by the act and has to report to the Appropriate Authority, in time. The AA can authorize any officer for this. Any person or social organization also can bring the notice of 15 days of alleged violation to AA with an intention to complaint in the court.

Offence to be Cognizable, non-bailable and not compoundable [1]

Once the complaint is lodge by the authority in court, the magistrate takes cognizance of the case and charges are framed for violation of the Act against the concern doctor. This is non-bailable offence and is also non-compoundable. Without judicial proceedings the case cannot be compromised. This is the gravity of the offence.

A court can take cognizance of an offence under the Act on complaint made by an officer authorized on that behalf by the AA by the provision of section of the PC-PNDT Act. Alleged deficiency or inaccurate maintenance of records in a prescribed manner as required under sub-section (3) of section 4 of the Act, the burden of proof that there is contravention of provisions of section 5 or 6 does not lie upon the prosecution.

Here, the prosecution does not take up the issue of "Burden of Proof". The doctor has to stand in the dock to prove his innocence. This is a step-motherly attitude towards the doctors in this regards.

Violation of the Act

Preconception sex selection refers to any procedure attempting to influence sex of offspring before pregnancy. Initially it was devised to select female fetus to get rid of as carrier of some diseases. Most recently this has been used for family balancing. The techniques includes methods of sperm processing to enrich for a particular sex chromosome by flow cytometry or various density gradient to separate heavier X sperm which carries more genetic elements and less heavier Y sperm contains less genetic elements. Over last one decade new technique called pre implantation genetic diagnosis (PGD) is the most effective method of sex selection and goes for in vitro fertilization (IVF) to enable testing of several embryos and there by select sex of desired embryo for implantation. These are very highly sophisticated technique carried out in genetic clinics, mostly.

"**Pre-natal diagnostic procedures**" means all gynecological or obstetrical or medical procedures such as Ultrasonography, Foetoscopy, taking or removing samples of amniotic fluid, chorionic villi, blood or any other tissue or fluid of a man, or a woman for being sent to Genetic Laboratory or Genetic Clinic for conducting any type of analysis or pre-natal diagnostic tests for selection of sex before or after conception.[1, 3]

The ultrasound clinics/imaging centers conduct only non invasive US imaging in a pregnant woman while referred by a doctor. There is no provision of obstetric examination, invasive facilities or termination of pregnancy in such centers. That is done elsewhere. There is also no scope of advertising of further genetics test. A simple report regarding the status and well fare of the fetus is furnished in such centers. The US centers, hospitals etc. have to be registered and must follow the instructions accordingly. If the form (F) is not filled up all the columns (9 to 19) properly we may get in to trouble.

Few important points of form (F) are as follows:

No. 9: History of genetic/medical disease-Basis of diagnosis-Biological, cytogenetic etc.

No. 10: Indication for prenatal diagnostic procedures-genetic.

No. 11: Invasive procedures performed.

No. 18: MTP advised/conducted.

No. 19: Date on which MTP conducted.

There is scope of revision of form (F) especially for the Ultrasound /imaging centers.

The unauthorized persons and unregistered centers also do antenatal USG examination with an intention to do sex detection of the fetus and do the heinous crime. The radiologist who does not perform the actual act of abortion, but are the victims. because of these unscrupulous centers where the big business of detection and abortion are done around the country.[4] There is provision for tracking of pregnancies,medical termination of pregnancies (MTP) and birth registrations by involving Anganwadi workers and the ASHAs (Accredited Social health Activists).[5] But this is not sufficient to put a check on illegal abortions.

The outcome and our role

There is no significant improvement in the child (0 – 6 years) sex ratio in India in highly focus states in 2011 census despite of the stringent law under implementation since 2003 and hundreds of prosecution being launched and doctors being sent to jail.

The Act has not made much head way till now. The problem of missing female child is grave. The results are to some extent disappointing. Other non-invasive technology like blood test allows much earlier sex determination and is threatening to this.[6] But due to the sustained campaign there is little improvements of CSR in India in 2016, i.e. 940. There is significant improvement of sex ratio at birth in states like Haryana and recorded 950 girls against 1,000 boys in March,2017. Haryana recorded sex ratio at birth only 832, in 2012 according to civil registration system which records all birth in a state.

The problem is deep rooted in the society and not just within the medical community. A strong and sustained campaign involving the doctors, NGOs and Government may be the solution of the problem. Awareness programs like articles, interview in media, publicity in cinema and television should go deep in to the society that the guilty would be punished. As a doctor we have to play an important role to save the society from this man-made catastrophe not only by abiding the PC-PNDT Act and also educating the society about the misuse of modern technologies for sex detection before birth and selective abortion.

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REVIEW PAPER

Different Aspect of Forensic Odontology

Kalita Chandana[1], Mahanta P[2]

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ABSTRACT

Introduction: *Expert testimony is very much essential in any civic as well as criminal trials. Forensic experts, those who are called to the court for their professional view must be amply qualified for the job. If there is any dental injury relating to a crime scene or dental malpractice, forensic dentist are also called for expert opinion.* ***Objectives****: Collecting different anecdote from different journals and other source, this paper has reviewed the role and importance of forensic dentists in the field of forensic investigation.* ***Discussion****: In any massacre of natural disaster or any crime scene involving single or multiple murders, identification of the deceased as well as the person involved is very much essential. Teeth and its associated structure help to achieve estimation of age, sex, race, reconstruction of facial anatomy, lip print, DNA fingerprinting, etc.* ***Conclusion:*** *Forensic dentistry is the study and practice of different aspects of dentistry that are relevant to legal problems. Identification of a person from different dental records by a forensic dentist has been already established and accepted in court.*

Keywords*: Forensic dentistry, Age estimation, Rugoscopy, Cheiloscopy, Radiograph*

INTRODUCTION

Earliest document regarding death investigation was discovered from Chi'in Dynasty (221-207 BC) in an archeological excavation, where instruction was given to do the examination of a corpse found dead in suspicious situation.[1]

Forensic odontology or forensic dentistry is an indispensable branch of science used for identification of a person that may be living or dead that needs lot of exploration in an organized way on scientific basis. Demand for the expertise of the knowledge in forensic dentistry is increasing day by day, as there is rapid growth of crime scenes in our society keeping aside the natural calamity.

These science originated in 49 AD when Roman empire Nero's mother Agrippina asked her soldier to cut the head of her rival Lollia Poullina and to bring it on a plate. She recognized it to be Lollia's head from misaligned and discolored front teeth.[2] Keiser-Nielson in 1970 defined forensic dentistry as "that branch of forensic medicine which in the interest of justice deals with the proper handling and examination of dental evidence and with proper evaluation and presentation of the dental findings.[3]

Teeth and jaw bones remains unchanged for long periods of time and can withstand extreme conditions of environment. It may remain unaffected, if immersed under water for long time, buried in soil, exposed to fire and numerous biological agents found in nature. Teeth have some unique characteristics due to which it is stronger than other tissues of the body. Except fingerprint analysis, dental record analysis is the most important method for identification of a victim either living or dead.

DISCUSSION

Various methods employed

Exploring dental tissues or teeth of the deceased may give information regarding socioeconomic condition, age, food habits of the person involved. As some of the dental treatment like bridge, implant, cosmetic restoration, full veneer crown are expensive and may not be easily affordable for person from low socioeconomic background, this may give clue to the examiner about his/her financial condition. A person with a good oral hygiene usually reflects an educated individual with good family background. A young boy will have prominent anatomical landmark like cusp, ridge with deep fissure, whereas an aged

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individual will show wears and tears on the tooth surface. People taking non vegetarian or hard food shows more attrition in the occlusal surface or the grinding surface than those who take soft food. Person used to take more carbohydrate in their diet may have more dental caries than a person used to have hard fibrous food. Various methods used by Forensic Odontologist are:

Reconstruction of face: Face can be reconstructed by sculpture with the help of clay on the basis of anthropological knowledge and can be digitized and transfer to a computer screen. Computer permits addition of components and with facial superimposition, the underlying skeletal structure can be viewed to check accurately.

Age estimation: Age estimation is essential of a direct victim involved in mass causalities, terrorist attack, and natural disaster or any misdeed, it is very important to know the age of the patient as every age has specific significance from medico-legal point. In some cases birth records are poorly maintained and in some records are falsified. Teeth play a vital role in identification of age estimation of a person. From development to mineralization, eruption and root completion every tooth travels a specific time line. Forensic Odontologist may help in age estimation by using various methods.[4]

Rugoscopy: Rugoscopy is the study of palatal rugae patterns. In any crime scene, road accident, plane crash, fire fingerprint may get destroyed, but rugae found to be intact. Because of its uniqueness it is considered as one of the important methods for identification.[5-8]

Cheiloscopy: It is the study of lip prints. Uniqueness of lip tracing is used to identify a person. Cheiloscopy word comes from the Greek word cheilos means lips. Anthropologist first introduced the possibility of lip furrows in individual identification. In 1902 Fisher first described the method of Cheiloscopy, which can be done as early as 6th week of intrauterine life.[9-11]

Radiographs: Used in forensic odontology to a great extent for estimation of age. It may help in determining the cause of death by revealing the evidence of Bullet or fragmented part of any foreign body. It is also a very important tool in diagnosis of child abuse. Radiograph of skull may help in identification by superimposing it with ante mortem radiograph or photograph.

The objectives of using radiographs in identification are to compare and evaluate similarities between ante mortem and post mortem films. These include six steps:

- Securing ante mortem radiographs
- Making post mortem radiographs
- Comparing meaningful features (those which are stable and distinctive)
- Accounting for discrepancies
- Assembling uniqueness
- Verbalizing the degree of confidence in the identification.

Bite mark: Analysis of a bite-mark case was published first by "Sorup". He used the term "odontoscopy," analogous to the term "dactyloscopy" used for fingerprint identification. Print of the bite mark is taken on a cast. After applying varnish, occlusal surface of the teeth are coated with printer's ink. Over the ink coated surface a moistened paper is pressed and this print is transferred to a transparent paper. Bite-mark is then compared by placing it over a life-size photograph of the suspect or victim.[11] One of the primary means of preserving and recording bite mark is photography, which is often round or elliptical and associated with contusion or abrasion or sometime with indentation.[12, 13]

Photographic study: Few techniques used in forensic photography are:

1. Visible light photography:-
   - Digital
   - Visible light color
   - Visible light black and white
2. Alternate light imaging and fluorescent technique.
3. Non visible light photography:-
   - Reflective long wavelength ultraviolet
   - Infrared

Keeping the record of the photograph of the injuries of the victim may become an essential part of lawful system and subject to chain of evidence rule. It is a duty of the forensic photographer to mark each photograph with a confidential system which consists of figures or letters including case number and the identification of the forensic photographer. Photographer should always store the original negatives and should not loose or part with it.[14]

Saliva: It has been found that saliva can be regained from bite marks, but of cigarette, envelop and postal stamp, and other items too.[15-21] Though it is difficult to collect dried saliva from the injured site, amylase essay may help in confirmation of its existence.[13] Saliva Polymerase chain reaction (PCR) allows replication of thousands of copies of a specific DNA sequence enabling the study from small amounts of DNA which can be taken from dental tissues.

Genomics and proteomics: Various scientific and technical details are involved in the process of DNA analysis in the process of identification.[22] For this process of identification, role of genomic and mitochondrial DNA from the pulp, dentin or cementum of teeth or desquamated cells in saliva are very important.[23] Contamination may lead whole process ineffective, that may occur at scene, during packaging, purification, storage or even analysis of the sample.

Dental records kept by dental surgeon are a legal document. Dental surgeon during their check up of oral cavity used to write

or should write the detail medical history, Patient's chef complaint, treatment need, previous treatment done, any history of trauma , or communicable disease where extra precaution may be called for. Forensic Odontologist should be aware of format and terminology used by dentist for dental patient record.[24, 25]

Importance from medico legal point of each age group: In forensic science every age group has importance from medico legal point. Forensic Odontologist must be aware of the importance of different age from medico legal view. [14]

As the human body ages, lot of biological and physical changes occur. Some are prominent and visible to our naked eye. When a child mature he or she gains weight, height etc., which may not always correspond to their actual age. This variation may lead to a wrong conclusion regarding victim's or criminal's age. Tooth plays a very important role because it leads a specific pattern in growth and development. Forensic Odontologist can verify or come to a conclusion about the age by studying the various developmental stages of tooth position. Radiographically the age can be determined of these children.

Another important point to observe is the knowledge of tooth anatomy to know the difference between deciduous and permanent dentition. Deciduous can often detected from wide pulp canal, short crown and root length, contact area situating more cervical, etc. In permanent teeth also person may have unique anatomical landmark like cusp of carabelli, peg lateral, denseindente, dilacerated root, fused teeth, neonatal tooth, paramolar and supernumerary tooth. With this anatomical knowledge not only we can ensure the type of teeth, but also we can diagnose different types of developmental anomaly like microdontia, macrodontia, hypoglossia, hyperglossia, dentinogenesis imperfecta, amelogenesis imperfect, anodontia, etc. Different acquired dental problems like mottled enamel, hypoplastic tooth, tetracycline staining, pink tooth, etc can also be determined from examination of the structures.

DNA Identification: Dental structures are relatively more resistant to higher temperatures. Techniques involving DNA in forensic dentistry offers a new tool when traditional identification methods fail due to the effects of heat, traumatism or autolytic processes, as well as in distortions and difficulties in analysis. They can provide a source of DNA for easy identification.[26]

Digital Forensics: With advanced technology, computers have taken a leap into the forensic world and the digital revolution has impacted all aspects of forensic odontology. The digital forensic process encompasses the seizure, forensic imaging and analysis of digital media and the production of a report into collected evidence of a crime. This also can be used to attribute evidence to specific suspects, confirm statements, determine intent, identify sources or authenticate the documents.[27]

LIMITATIONS

Forensic odontology has played a key role in identification of persons in mass disasters (aviation, earthquakes, tsunamis), in crime investigations, in ethnic studies and victims of motor vehicle accidents. All the methods described above have some or the other shortcomings. The discrepancies associated with them are to be weighed cautiously to make forensic odontology a more accurate, reliable and reproducible investigatory science. As dental features change over time, changes can occur after obtaining antemortem records. Extraction, trauma, exfoliation, periodontal disease, caries and prosthesis work can change the configuration of teeth. [26]

CONCLUSION

Thus forensic Odontologist must

- Have sufficient knowledge on dental anatomy
- be aware of every newer techniques involved in the process for identification
- Take the precautions to avoid contamination during sample collection
- Be observant enough to collect every necessary detail from the crime scene as early as possible
- Diligent enough to use the evidence, narrowing down to the possibilities and to come to a conclusion after comparing, adding, deducting the gathered information in a systematic manner.

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Adverse Drug Reactions with Drugs used in Pulmonary Medicine: A Pharmacovigilance Study

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ABSTRACT

World Health Organization defines Adverse Drug Reaction (ADR) as "Any response to a drug which is noxious and unintended, and which occurs at doses normally used in human beings for the prophylaxis, diagnosis or therapy for a disease, or for the modification of physiological functions".[1] ADR is considered to be responsible for 2.9 to 5.6% of all hospital admissions, either directly or due to ADR related events. It is associated with significant morbidity, disability and it may cause financial burden on patients due to prolonged hospitalization. A hospital based pharmacovigilance study on ADR with drugs used in the Pulmonary Medicine Department of Gauhati Medical College Hospital was undertaken over a period of six months. Criteria for identifying ADR were based on spontaneous reporting by physicians in Pulmonary Medicine department. Case records having incomplete patient information were excluded from this study. The causality of the reported ADRs was carried out using Naranjo's scale, and the severity of ADR was assessed with Hartwig's scale. Hospital records of 214 consecutive patients admitted to the Pulmonary Medicine department were analyzed for the reports of ADR. A total of 44 patients (20.56%) were found to have some type of ADR. The highest incidence of ADR was reported in the age group of 50 - 69 years. Hepatitis, nausea, vomiting, chest pain, loss of appetite, vertigo, dryness of mouth and sore throat were the prominent manifestations of ADR in this study. The drugs causing ADRs were classified as (a) First line of anti-tubercular drugs, (b) Corticosteroids, and (c) Other drugs used as supportive therapy. Out of the 44 patients with ADR, 5 patients improved with change of drugs, 24 patients improved without any change of drugs, and 15 patients improved with addition of other drugs. Analysis of the causality using Naranjo's scale showed that 20 (45.4%) ADRs were "Definite", 16(36.4%) were "Possible", and 8(18.2%) were "Probable". In analysis of the severity using Hartwig's scale, 32 (72.8%) of ADRs were mild, 7(15.9%) were moderate, and only 5(11.3%) were severe. There was no patient with ADR resulting permanent disability or death.

***Keywords:** Pharmacovigilance, Adverse Drug Reaction, ADR*

INTRODUCTION

Adverse drug reaction (ADR) has been defined by Edwards et al.[2] as "an appreciably harmful or unpleasant reaction, resulting from an intervention related to the use of a medicinal product, which predicts hazard from future administration and warrants prevention or specific treatment, or alteration of the dosage regimen, or withdrawal of the product." Drugs, no matter how safe and efficacious, are always coupled with the inescapable risk of adverse reactions. Though modern medicine has changed the way in which diseases are managed and controlled, despite all their benefits evidence continues to mount that adverse reactions to medicines are common but preventable causes of morbidity and even death.[3] In some countries, ADR is recognized as among one of the top ten leading cause of hospital deaths.[4] ADR also adds to the already existing morbidity of the patient, prolongs the hospital stay and increases the healthcare cost.[5,6,7,8,9] Early detection, evaluation and monitoring of ADR are essential

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to reduce the increased morbidity of the patients, reduce treatment cost and hospital stay.

Although the concept of ADR monitoring and evaluation of data has been conducted for the last four decades in developed countries, the subject is still in its infancy in India. WHO started the programme of ADR monitoring in 1968 and India became a member of it in 1997.[10] With India becoming an attractive center for clinical trials and being one of the largest producers of pharmaceuticals in the world, it has become essential to set up a very strict pharmacovigilance system to prevent the population from potential harm that may be caused by ADRs.

ADR reporting is often delayed and inconsistent in format.[11] The incidence of ADR is likely to increase with advanced age and exposure of elderly patients to poly-pharmacy. This situation can be ideally studied in the Pulmonary Medicine department because of availability of case materials fulfilling both these criteria. Pharmacological therapy of asthma, chronic obstructive pulmonary disease (COPD) in the elderly patients can be potentially hazardous. Beta-2 agonists administered for asthma and COPD may cause adverse effects like hypokalemia. Diuretics and corticosteroids can cause electrolyte disturbances. Beta-2 agonists may also cause tremor and alteration in blood pressure. Long term treatment with oral or inhaled corticosteroids may cause suppressed adrenocortical functions. Theophylline may cause nausea and vomiting, sinus or supraventricular tachycardia. Anticholinergic drugs like ipratropium bromide can cause unpleasant taste and dryness of the mouth. Anti-tubercular drugs can cause a wide range of ADR, the most serious one being hepatitis.

The present study was undertaken to analyze the pattern of commonly encountered ADRs in the Pulmonary Medicine department, in relation to age and sex related variations, type and severity of ADR and the probable management strategy.

MATERIALS AND METHODS

This prospective observational study was carried out over a period of six months in the Pulmonary Medicine department of Gauhati Medical College Hospital. The aim of the study was to identify the reported incidence of ADR, type of drugs causing ADR, age and sex related distribution of ADR, determine the causality and severity of ADR. For detecting the incidence of ADR, an adverse drug event reporting form containing all possible aspects of adverse drug reaction was used. For assessing the causality, Naranjo's causality assessment scale was used. This scale classifies the ADR as (a) Definite/Highly probable, (b) Probable, (c) Possible and (d) Unlikely according to the score calculated for a particular drug reaction or combination of reactions. For assessing the severity of the ADR, the assessment scale proposed by Hartwig was used. This scale prescribes different levels of severity from level 1 to 7. For validation of ADR, all reactions were discussed and confirmed with the attending physicians. Prescribing indicators were: (1) Total number of drugs contributing to ADR, and (2) Most commonly implicated drug in the study. Statistical analysis was done for age and sex related variables, drugs most frequently implicated for ADR, causality and severity of ADR.

RESULTS

The result is based on screening of the records of 214 patients undergoing treatment in the Pulmonary Medicine department of Gauhati Medical College hospital during the study period. The age and gender distribution is shown in **table 1**. It is observed that the incidence of ADR was highest in the age group of 50 - 69 years.

Table 1 Showing age and sex distribution

Age group in years	Number of patients	Male	Female	Percentage distribution
≤ 19	2	0	2	0.93
20-29	25	11	14	11.68
30-39	28	10	18	13
40-49	29	16	13	13.55
50-59	56	39	17	23.33
60-69	42	24	18	19.62
≥70	32	19	13	14.95
Total	**214**	**119**	**95**	**100**

Out of 214 patients treated with various medications, 44 patients (20.56%) were reported to be having some kind of adverse drug reactions, which are shown in **table 2**. There were 24 males and 20 females in the effected group. Hepatitis, nausea and vomiting, chest pain, loss of appetite, vertigo, dryness of mouth and sore throat were the prominent symptoms of adverse drug reactions. The drugs responsible for causing ADR were the first line of anti-tubercular drugs (40.9%), corticosteroids (13.6%), and other drugs used in the department (45.4%).

Table 2 Showing list of ADR reported in 44 patients

Type of ADR	Number of patients	Male	Female	Percentage distribution
Hepatitis	5	3	2	11.3
Nausea	7	3	4	15.9
Vomiting	5	2	3	11.3
Chest pain	4	3	1	9
Loss of appetite	10	6	4	22.7
Vertigo	5	2	3	11.3
Dryness of mouth	3	2	1	6.8
Sore throat	5	3	2	11.3
Total	**44**	**24**	**20**	**100**

Majority of the patients with ADR belonged to the 50-69 years age group. The percentage of ADR in the age group of 50-59 years was 28.57% and in the age group of 60-69 years it was 23.81%, with the overall percentage of incidence being 20.56%. **Table 3** shows the age wise break up of patients with ADR.

Table 3 Age wise break up of patients with ADR

Age group in years	Number of patients with ADR	Total number of patients	Percentage distribution
≤ 19	0	2	0
20-29	3	25	12%
30-39	3	28	10.7%
40-49	5	29	17.24%
50-59	16	56	28.57%
60-69	10	42	23.81%
≥70	7	32	21.87%
Overall	44	214	20.56%

The adverse reaction due to the first line of anti-tubercular drugs was found in 18 patients (40.9% of total patients with ADR). It was found with corticosteroids in 6 patients (13.6%), and 20 patients with ADR (45.4%) were found to be due to drugs other than anti-tubercular drugs and corticosteroids. out of the total of 44 patients with ADR, 5 patients improved with change of drugs, 24 patients improved without any change in medication and 15 patients improved with other drugs added in the management of these patients.

The causality assessment was done using Naranjo's scale.[12] According to this score, 20 patients (45.4%) were classified as Definite/highly probable, 8 patients (18.2%) were probable, 16 patients (36%) were possible and there was no patient in the unlikely group.

The severity assessment was done using Hartwig's scale.[13] According to this scale, there were 32 mild adverse drug reactions (72%), 7 moderate reactions (15.9%), and 5 severe reactions (11.3%).

DISCUSSION

Adverse drug reactions are commonly encountered in clinical practice all over the world. Although many of these reactions are mild and disappear when the drug suspected to be causing it is withdrawn or the dose is regulated, some of the reactions are more serious and they last longer. In some cases they may be the causes of increased morbidity and prolonged hospital stay, and even may cause permanent disability or death.

Although all new drugs introduced into the market undergo clinical trials to demonstrate efficacy and detect adverse reactions, it is probable that only the most common ADRs are detected by the time the drug is marketed. Moreover clinical trials are unlikely to be carried out in some groups of individuals like elderly or pregnant women. Pharmaceutical products must therefore be continuously monitored in the clinical practice. Monitoring systems include manual methods and combined electronic and manual methods. The former may be voluntary reporting by service provider, which may again be incidental reporting or prompted spontaneous reporting. Methods of involuntary reporting include patients' record review, reporting by trained observers and by patient interviews. Combined methods use electronic data available from laboratory reports of patients likely to have ADR as screening criteria, which is manually confirmed. Other modalities for detection of ADR are individual case reports, prospective cohort studies, case control studies, patients record linkage studies and hospital based population studies. Besides these, WHO Collaborating center for International drug monitoring, established in 1968, collects ADR reports from participating countries.

In a meta-analysis study conducted by Lazarou et al.,[14] overall incidence of serious ADR was found to be 6.7% and fatal ADR was reported in 0.32% of hospitalized patients, making these reactions between the fourth and sixth leading cause of death. Several studies have been done for detection of ADR with drugs prescribed for respiratory diseases like COPD, Pulmonary tuberculosis, Asthma, Respiratory tract infections etc.[15,16,17] Besides the known adverse reactions reported with the use of common drugs prescribed for these conditions, there may be some uncommon or rare events which may be encountered with these drugs. The higher percentage of elderly patients admitted to the pulmonary medicine department is also another factor to be counted. It was observed in the present study that the proportion of patients belonging to the age group of 50 to 69 years was the highest, and consequently the percentage of ADR seen in this age group was also highest. There were fewer patients below the age of 40 years admitted in this department and the percentage of ADR seen in this age group was also less.

The purpose of the present study was to introduce an ADR monitoring programme in the Pulmonary Medicine department to identify and assess the nature, type and the drugs responsible for ADR, as well as to determine the causality and severity of ADR observed in this department. The physician prompted spontaneous reporting method was adopted. During the six month period of study a total of 214 patients were studied and 44 patients were reported to be showing adverse drug reactions. An interesting finding in this study was that out of 44 patients reported to be showing ADR, 20(45.4%) were classified as Definite in Naranjo's scale, majority of them being mild ADR (72%) by Hartwig's scale. No case was reported which may have been included as 'Unlikely' by Naranjo's scale. Another interesting finding in this study was that gastro-intestinal symptoms like nausea, vomiting and loss of appetite constituted a major proportion of the ADR, while 5 out of 44 ADR cases (11.3%) had signs of hepatitis. All cases recovered with adequate modification in the prescription of drugs like change of drug or addition of another drug, or with time and without any modification in drugs. There was, however no permanent disability to the effected patients, neither was there any death in this series.

CONCLUSION

This is a hospital based pharmacovigilance study carried out in 214 consecutive patients admitted to the Pulmonary Medicine department of Gauhati Medical College hospital. A total of 44 patients (20.56%) were found to have some type of ADR. The highest incidence of ADR was reported in the age group of 50 - 69 years. Hepatitis, Nausea, vomiting, chest pain, loss of appetite,

vertigo, dryness of mouth and sore throat were the prominent manifestations. The drugs causing ADRs were first line of anti-tubercular drugs, Corticosteroids and drugs used as supportive therapy. Out of the 44 patients with ADR, all improved with either change of drugs, addition of other drugs or with time without any change of drugs. Analysis of the causality using Naranjo scale showed that 20 (45.4%) ADRs were "Definite", 16(36.4%) were "Possible", and 8(18.2%) were "Probable". In analysis of the severity using Hartwig scale, 32 (72.8%) of ADRs were mild, 7(15.9%) were moderate, and only 5(11.3%) were severe. Although this is a small series, the significant observation was that there was no permanent disability or death.

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Pylorus Preserving Supracolic Dissected Pancreaticoduodenectomy with Binding Pancreaticojejunostomy

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ABSTRACT

Patients suffering from periampullary cancers undergo pancreaticoduodenectomy. A standard R0 resection is advisable for a fair survival. Complications after this procedure hover between 2% to 7% in different institutes and high output centers. The Achilles' heel of this procedure is the pancreaticoenteric anastomosis. From simple pancreaticojejunal anastomosis to duct to mucosa, dunking, pancreaticogastrostomy with or without antral opening to binding pancreaticojejunostomy are followed in different institutes. The supracolic dissection makes the approach to the pancreatic mesentery easy. However pylorus preserving procedure makes gastrostomy difficult. In such a situation we present our small experience on the subject and the results herewith. From 2003 to 2011 we have taken up patients for Whipple's surgery in our unit. We could operate on the six patients who were a part of almost 50 patients who were ultimately found to be operable. Few patients underwent Triple bypass and at least one patient we closed without any procedures because of the advanced nature of the disease. There was no operative mortality. One death on the 12th post op day due to ARDS(?) in the ICU. One died after 30 days. But all the patients were well after surgery. At least one patient survived over 24 months. The procedure mentioned here is worth a try.

***Keywords:** Periampullary cancers, Whipple's, Pancreaticoenterostomy, pancreaticoduodenectomy, R0 resection, pylorus preservation, supracolic dissection*

INTRODUCTION

Pancreaticoduodenectomy (PD) is a complex surgicalprocedure. The procedure, which is also known as Whipple's procedure, is performed for periampullary cancers primarily. It can be safely said that this is one procedure which has a number of variants. The reasons for this procedure getting special attention are many. The prominent amongst them are difficult anatomy of the area, the leakage rate, high mortality and morbidity rate after the surgery and differences of survival between the patients suffering from cancer of the lower bile duct and the pancreas head.Involvement of the Portal vein makes the area more complex for an RO clearance too. Certain deviations are followed in different institutesas per the institutional philosophy. Certain variants like binding pancreaticojejunostomy, supracolic dissection of the duodenum and pylorus preservation are some of the additional features suggested for a safer Whipple's procedure.

Here we present our experience gained on 6 such patients.

MATERIALAND METHODS

6 patients, 5 male and one female patient underwent the procedure. All patients were detected with Cancers around the head of pancreas. The male patients were from 46 - 62 Years, the female was 66 years old. All had varying level of raised Bilirubin (From 11 to 19mg/dl.). These patients were serially selected for the procedure mentioned and the Patients were prepared for Whipple's procedure and precededwith pylorus preserving supracolic dissected pancreaticoduodenectomy with binding pancreaticojejunostomies.

PROCEDURE

Abdomen was opened with a Chevron incision in all cases. Exploration was done to see any metastasis before proceeding with the dissection. The right hemi colon as well as the Transverse colon was widely mobilized first and Kocherization was done to Aorta. We perform an extended Kocherization so that the Pancreas body rests well over the operating hand. In addition this helps in identifying the retro pancreatic spread of the disease

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to Superior mesenteric artery. This is a crucial step as Involvement of the superior mesenteric artery as well as the root of the transverse mesocolon is considered to be of poor post operative survival. The Gastro duodenal artery is suture ligated once the lesser omentum is dissected. At this stage we make a tunnel to encircle the neck of the pancreas, thereby avoiding the point of no return. The gall bladder is dissected and common duct is transected at the end of the CHD. The neck is transected with Diathermy. The Duct is usually transected with sharp instruments. At this stage the wide and extensive Kocherization helps in separation of the Mesentery from the Portal vein and superior Mesenteric artery. This step is meticulous and takes up most of the operative time. As the neck is transected, attention is diverted to the Pylorus and the ligament of Treitz. Pylorus is transected at the prepyloric vein. Jejunum is delivered to the supracolic compartment and transected at the level of the second Jejunal artery. The whole block is removed en block with the dissected fibro fatty tissues , which include the nodes and the lymphatics. All bleeding points are managed at this stage before any anastomosis is undertaken. The pancreas is freed from all attachment for a distance of 3-4 centimeters. The end of the jejunum is inverted over itself. 3 centimeters of the Jejunal mucosa is destroyed and slid over the pancreas body. We always did a duct to mucosa anastomosis before sliding over the end of the jejunum in all cases. The binding ligature is applied over a Lahey forceps. A few retaining sutures are also placed to secure the pancreas to remain inside the sleeve, which of course is not necessary as per the original authors. A hepaticojejunostomy and a jejunojejunostomy complete the procedure. We routinely create a feeding jejunostomy and drain the area and closed in a standard manner.

Operating time varied from 4hours 30 (Female) minutes to 9 hours (male). Total Blood loss was minimal (<300ml.) in all patients.All patients recovered well and smoothly from anaesthesia. All patients were ICU observed for 24 hours and shifted to the wards on the third post operative day. Oral liquids started the next day as per our early feeding principle and solid allowed on day 4 in all patients.

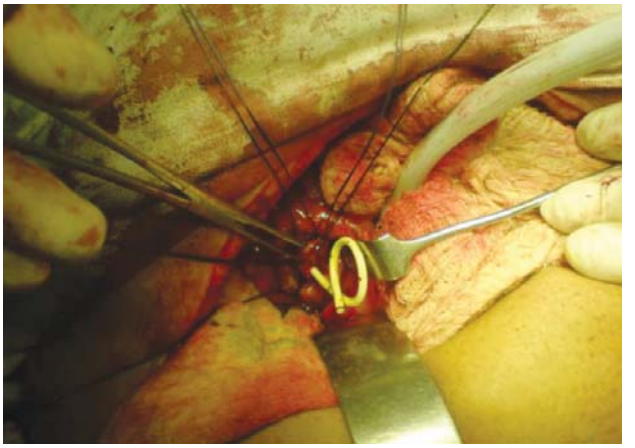

Figure 1 One of the cases who had a stent placed

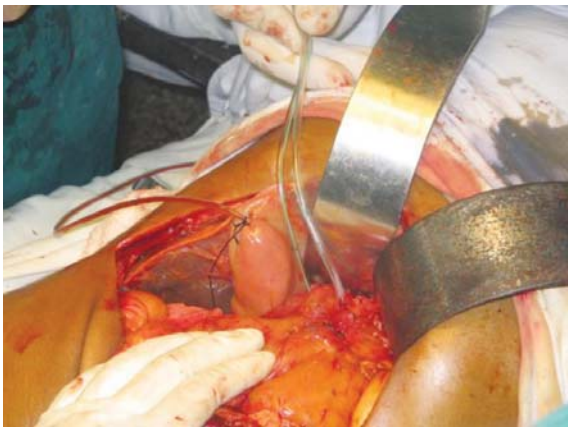

Figure 2 Supracolic dissection

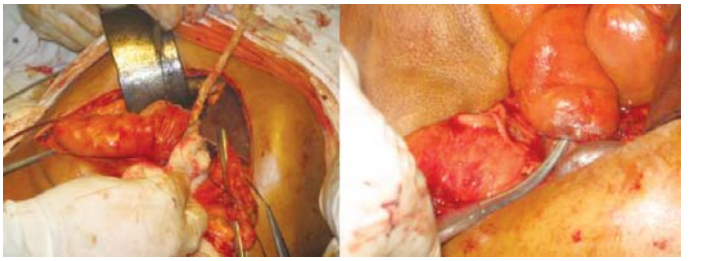

Figure 3 (a) Jejunum everted for Peng's procedure, (b) Binding PJA

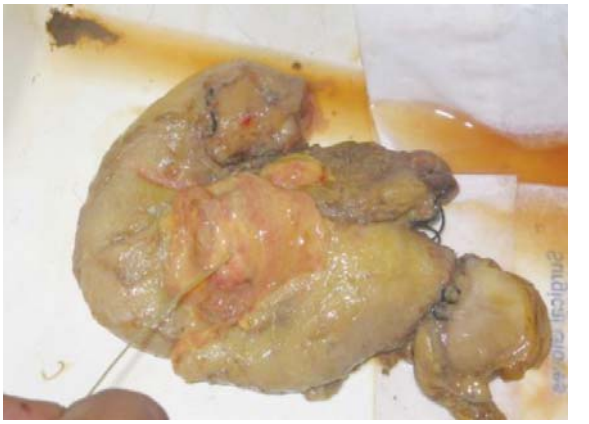

Figure 4 Total Specimen

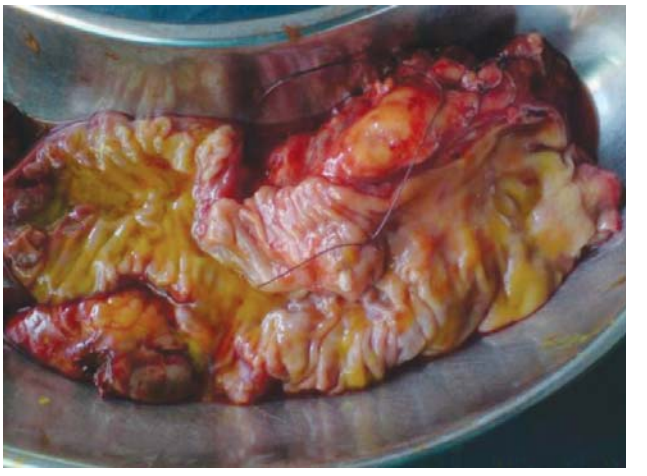

Figure 5 Whipple's specimen Split

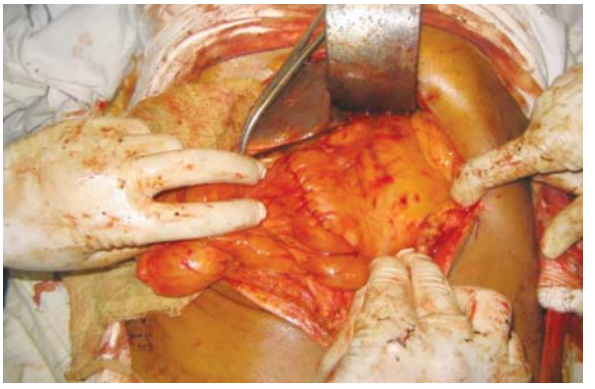

Figure 6 GJA, Completion of Procedures

RESULTS AND OBSERVATION

One male patient (62 Years old) Developed sepsis and developed wound abscess. The wound collection was drained and Antibiotics started with the support of the Culture and sensitivity report. Discharge from the wound was tested for pancreatic enzymes and the enzyme levelsfound to be normal. This particular patient was on normal diet and was passing stool and flatus normally. Fistula was ruled out and repeat culture and sensitivity was periodically undertaken. This Patient died 32 days post operative. The female patient was normal till the 8th evening. She developed respiratory distress on the night of 9th post op day. The patient was shifted to the ICU. Expired on day 12 due to severe chest problem. Both the cases were on normal diet, passing stool and urine and had near normal liver function on the day of death. Rest of the patients behaved normally. They were discharged from hospital from 9th to 11th post operative day. Two came for regular checkups for over 12 months. One male patient 46 years old, developed secondaries in liver 18 months post surgery and the second was well upto 24 months after surgery and then lost to follow up.

Table 1 Briefly summarizing the patients particular

Pt.	Age/Sex	Disease	Procedure	Outcome	Remarks
A	46/M	Periampullary ca	Pylorus Preserving supracolic Dissected PD with Binding PJA	Survived	Followed up over 14 months
B	55/M	Periampullary ca	Do	Survived	Followed up over 9 months
C	66/F	Periampullary ca	Do	Died 10th Post op. day	ARDS, No leakage
D	60/M	Periampullary ca	Do	Survived	Followed up over 9 months
E	62/M	Periampullary ca	Do	Died after 30 days	Sepsis, No leakage
F	58/M	Periampullary ca	Do	Survived	Lost after one month check up

DISCUSSION

Whipple's procedure is almost a routine procedure in any well equipped centre and wherever there are surgeons to take up the surgical exercise. The extent of the procedure varies from surgeon to surgeon as well as institutional philosophy. The range of resection extends from mere Pancreaticoduodenectomy to pylorus preserving and radical/ extended lymph gland dissection (R0) to portal vein excision. Whatever is the correctness of the procedure the main components of the procedure are resection of the pancreas, duodenum, lower end of the CBD along withhepaticojejunostomy, pancreaticojejunostomy/ pancreaticogastrostomy and jejunojejunostomy. Out of these three anastomoses, leakage of pancreas is the most dreaded and important reason of mortality as well as morbidity of the procedure**.** Much has been discussed about how to reduce the risk of this leak and many methods tried. The routine use of sandostatin to reduce the leak rate has also fallen into disfavor. At this juncture the binding pancreaticojejunostomy is worth consideration. Similarly the concept of duodenal mesentery and total supracolic dissection leaves the infra colic compartment free from handling thereby reducing the chance of prolonged paralytic ileus.

Pancreaticoduodenectomy is a difficult procedure. Although the procedure goes by the name of Whipple's procedure, its progress was started byCodivilla in 1898.[1] He of course did not do the pancreaticoenteric anastomosis and merely ligated the stump of the pancreas end. It was Kausch in 1921, who in a two stage procedure performed Pancreaticoduodenectomy and later did a pancreaticojejunostomy.[2] Whipple did the first procedure in 1946[3] and it was Cattel who finally understood the death of the post surgery patients due to pancreatic juice leakage and suggested pancreaticoenterostomy in all patients undergoing Pancreaticoduodenectomy.[4]

Although the present rate of pancreatic fistula is stated to be around 2%[5,6] in exceptionally good and skilled hands, the rate varies from 10% to 20% in various specialized centers.[7-11] To avoid this dreaded condition many hypothesis are suggested for the causes. Soft Pancreas, small duct size (<2mm) and high juice output[16] are considered to be the triad of danger. Similarly performing a parachuting technique of implantation of the stump to the jejunum to simply connecting the stump to the posterior wall of the stomach[13,14,15,16] could not achieve safety from the leakage of the anastomosis.[13,14,15] A new method of binding pancreaticojejunostomy was suggested from China with 100% leak proof results.[12,18]

Meanwhile a new concept of the mesentery of duodenum has taken ground and its practicality was shown by some of the surgeons. Even variations in this technique are followed these days like SMA hanging technique.[19] They performed the whole dissection of the Whipple's procedure from the supracolic compartment only. This simple technical modification led to simplifying of such a big procedure and is presently being evaluated worldwide

Presently the pylorus preserving Pancreaticoduodenectomy is also favored by many.[16] Simultaneously the overzealous Japanese radical associated gland dissection was gaining disfavor amongst the Japanese surgeons themselves and presently the opinion is in favor of routine gland clearance only (Prof. Nimura, unpublished data).

Considering all the aspects it can be said to be a procedure needing attention. The result obtained and experience gained by undertaking the procedure was worthwhile since the patients survived the difficult, new and intricate procedure better than recognized international average (Metanalysis of survival after PD, 2010).

CONCLUSION

In the conclusion it can be said that surgery of cancer pancreas has changed in the last two hundred years. The international experience, especially the Japanese workers', has settled the question of the extent of dissection required for the procedure. Doing anything less than that of the regular node dissection along with Pancreaticoduodenectomy for cancer head of pancreas and periampullary cancers is probably not advisable in today's scenario. R0 resection is preferable these days. The procedure mentioned here matches the otherwise a standard Whipple's procedures in different institutes and should be given attention.

Conflicts of interest: No conflict of interest is associated with this work.

Contribution of Authors: We declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

Ethical clearance: Taken from Institutional Ethical Committee.

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ORIGINAL PAPER

Clinical Profile of Chronic Kidney Disease in Children

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ABSTRACT

Background: CKD is an important cause of mortality, morbidity and impaired quality of life in children. Data in paediatric population is sparse from this part of the country. A better understanding about the epidemiology and preventable factors can help in better management of these children. **Aims:** To study the etiology and clinical profile of the children with chronic kidney disease who attended Gauhati Medical College and Hospital, Assam. **Materials and methods**: The demographic, clinical profile and biochemical data of the children diagnosed with CKD, admitted in our Institute from August 2013-July 2016 were analysed retrospectively. CKD was defined according to NKF-K/DOQI 2002 clinical practice guideline with GFR below 60ml/min/1.73m^2 estimated by modified Schwartz formula. Records were reviewed to search for their etiology and clinical profile like height, weight, BMI, presence of anaemia or hypertension. Also outcome where available were recorded. **Results:** Among 101 children diagnosed as CKD, 65 (64.35%) were boys. The mean age of presentation was 14.87years of age (range 3 yrs to 18yrs). Only 4 children were less than 5 years of age. The mean GFR at presentation was 14.67ml/min/1.73m^2.61% of the children were already in CKD stage 5. The causes of CKD included glomerular diseases (35.6 %,), interstitial and obstructive causes (38.61%), miscellaneous (6.9%) and undetermined (18.81%). Among glomerular causes chronic GN (15.84%) was most common, followed by FSGS (8.91%) and IgA nephropathy (4.95%). Reflux nephropathy was seen in 10.89% and obstruction in 9.9%. Most patients were anaemic with mean haemoglobin at time of admission of 6.4gm/dl. By the end of the study period 8 children had undergone transplantation, 22 children were undergoing conservative therapy, and 42 children were lost to follow up. **Conclusions:** Obstructive and interstitial nephritis comprises a large subgroup of CKD in children from this region. Most of the children carry poor prognosis in view of their late presentation. Majority of the children were unable to undergo any effective therapy and were lost to follow up in view of limited availability and high cost of therapy.

Keywords: Glomerular diseases, chronic interstitial nephritis

INTRODUCTION

Rubella or German measles is a exanthematous fever characterized by transient macular rash and lymphadenopathy. In itself, the disease is trivial but rubella in the pregnant woman may lead to congenital malformation in the baby.[1] But in the world, half a million pregnant women die each year, many from such infection. Rubella virus infection acquires a special significance in pregnant women as the virus may enter the fetal circulation through the placenta.[2] Unfavourable outcome to pregnancy has become a serious problem in the society. Rubella virus infection during pregnancy can be a serious threat to the fetus with possible loss of pregnancy and dieases of newborn of which, encephalitis,

INTRODUCTION

Chronic Kidney disease is increasingly recognised as a major public health problem.[1, 2] As Chronic kidney disease is an irreversible condition that eventually progresses to End stage renal failure, it becomes an important cause of morbidity, mortality and impaired quality of life in children.[3-5] The magnitude of CKD varies from one geographical region to another depending on the genetic factors, environmental factors and local practice.

Unlike in adult population, where extensive epidemiological research is available, data in paediatric population is sparse.[6-9]

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CKD in early stages is mostly asymptomatic and hence remains undetected or under-diagnosed. In developing country like ours where optimal health care is still out of the reach to many people, early detection of CKD is rare and patients mainly present late with all the complications. Knowledge about the magnitude, etiology, risk factors and outcome of CKD will help in proper allocation of limited resources in a developing country.

The aim of the present study was to examine retrospectively the clinical profile of CKD in paediatric patient who attended our centre.

METHODS AND MATERIALS

We reviewed the medical records of all paediatric CKD patients between 2- 18 years of age, who were admitted at Nephrology department of Gauhati Medical College & hospital, Guwahati between the periods of August 2013- July 2016. Clinical features like pallor, edema, oligoanuria, hematuria or any other urinary or voiding dysfunction were recorded. Examination findings included weight, height, BMI, blood pressure. Hypertension was defined as BP e"95th percentile or as self-reported hypertension plus current treatment with antihypertensive medications. Laboratory data included blood biochemistry, urinary findings & radiological studies. Renal histopathology, where available were included. CKD was defined according to 2002 NKF-K/DOQI criteria for classification of CKD, as presence of markers of kidney damage for > 3month with evidence of structural/functional abnormalities of the kidney with or without decreased GFR that is manifested by either pathological abnormalities or other markers of kidney damage in the blood, urine or imaging tests or eGFR <60ml/min/1.73 m² for >3month as estimated by modified Schwartz formula with or without kidney damage.[10-12] Children less than 2 years of age were excluded, as NKF-K/DOQI classification criteria apply to children above 2years.

The patients of CKD were classified in four broad categories based on etiology.

a) Glomerular causes; chronic glomerulonephritis either biopsy proven or when biopsy was not done, a probable diagnoses of chronic GN was made based on history of prolonged duration of oedema and proteinuria.

b) Interstitial or Obstructive causes; when there was obvious finding of reflux, hydronephrosis, neurogenic bladder, dysplastic kidney or obstruction in radiological studies. A subgroup of unknown aetiology of chronic interstitial nephritis was made if therewere any features suggestive of recurrent urinary tract infection, indigenous medicine intake, scarred kidney or proteinuria <1000mg/m²/day.

c) Miscellaneous causes; included cystic kidney diseases, as evidenced by radiological study. Alport disease was diagnosed based on presence on presence of sensorineural deafness, lenticonus and family history of Nephritis.

d) Chronic Kidney Disease of Unknown etiology; included patients where clear-cut diagnoses regarding the aetiology could not be made.

RESULTS

After reviewing the records, we found 101children with CKD, where data was adequate for evaluation. The median age of the children was 13years (range 3-18 years). Mean age (SD) at presentation was 14.87years ± 3.65. The youngest child was 3 years of age and there were only 4 children below the age of 5years (figure 1).There were 65 male children with a sex ratio of 1.8: 1(figure 2). At presentation , majority of our patients were in CKD stage 4 and 5 with a mean eGFR of 14.64 /min/1.73m² (**Table 1**). 27 (26.73%) children had an eGFR <10 ml/min/1.73m².

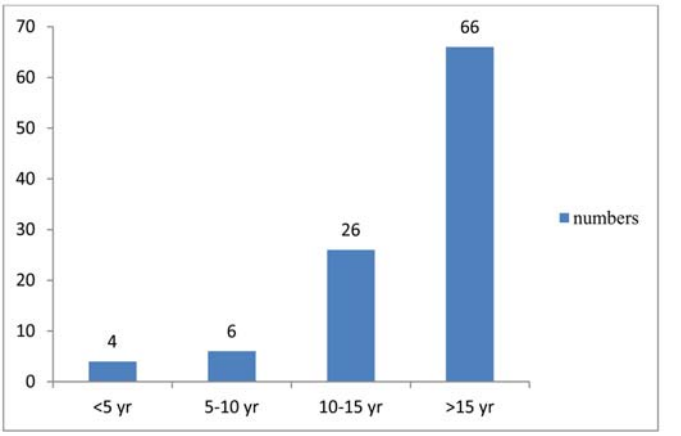

Figure 1 Age distribution of children with CKD

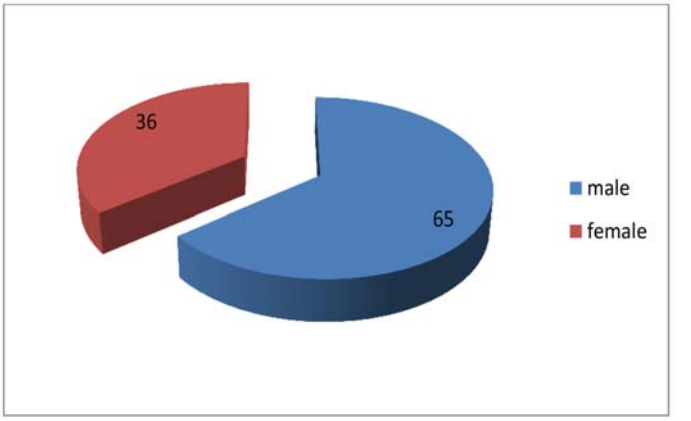

Figure 2 Sex distributions of children with CKD

35 children had presented with facial or pedal edema, while 49 patients presented with history of oligoanuria. Voiding dysfunction was present in 25 children. Anaemia was very common, seen in 74 children, with a mean haemoglobin level of 6.1gm/dl (± 2.1). Hypertension was found in 58(57.42%) children. Etiology of CKD is shown in **Table 2**.

Table 1 Stages of CKD at presentation

Stage of CKD at presentation	Frequency	Percentage
Stage 3(30-59ml/min/1.73m^2)	4	3.96
Stage 4 (15-29 ml/min/1.73m^2)	36	35.64
Stage 5 (<15 ml/min/1.73m^2)	61	60.39

Table 2 Etiology of CKD

Etiology	Frequency	Percentage
Glomerulonephritis	36	35.64%
Chronic Glomerulonephritis (Unknown)	16	15.84%
FSGS	9	8.91%
IgA nephropathy	5	4.95%
SLE	6	5.94%
Obstruction & Interstitial causes	39	38.61%
Primary reflux	11	10.89%
CAKUT-PU	5	4.95%
CAKUT- Hypo plastic –Dysplastic Kidney	2	1.98%
Neurogenic Bladder	2	1.98%
Obstruction	10	9.90%
CIN (unknown)	9	8.91%
Miscellaneous	7	6.93%
Cystic kidney disease	4	3.96%
Alport syndrome	2	1.98%
Ischemic Nephropathy	1	0.99%
CKD (Unknown)	19	18.81%

Out of 101 patients, till last follow up, 22 patients were undergoing conservative management, 18 patients expired, 12 patients were undergoing maintenance haemodialysis. 8 patients underwent live related renal transplantation, of which 6 patients are doing well with a functioning allograft, while 2 expired following sepsis. A majority of the patient, 42 (41.58%) were lost to follow up.

DISCUSSION

Globally, the numbers of CKD patients are increasing markedly to the extent that it has become a major public health concern. The incidence and aetiology of CKD varies in different parts of the world. The paediatric incidence of CKD in Europe is reported to be around 11–12 per million of age-related population (pmarp) for stages 3–5, while the prevalence is <"55–60 pmarp.[13-15] The median incidence of renal replacement therapy (RRT) in children < 20 years worldwide range from 4-18 per million age related population.[16]There is limited information about the epidemiology of CKD in paediatric population around the world, especially from developing or low income countries. Precise incidence of CKD in children is lacking from our country. In a study from SGPGIMER, Lucknow showed that children constitute 5.3% of total cases of CRF cases referred.[7]Our study being retrospective in nature was unable to comment of the exact incidence and prevalence of the same.

The median age of our patient was 13 years, and only 4 patients were under the age of 5years. This was in contrast to an earlier report from AIIMS, New Delhi, where the median age of the patient was 8 years and 96 children below 5 years of age.[8] In the study from Lucknow, the median age was 13 years.[7]In our study, 66 (65.35%) children were above 15 years. The delayed presentation may be due to delayed diagnoses and referral. The incidence and prevalence of CKD is greater in males than females because of the higher frequency of congenital abnormalities of the kidney and urinary tract (CAKUT) in males.[16]In our study 65.35% of the patients was male.

In our study, 60% of the children were in ckd stage 5. The mean eGFR at presentation was 14.67ml/min/1.73m², which indicates delayed presentation at an advanced stage. The delayed presentation in our study population may be because of poor public health awareness, delayed detection and poor access of patients from rural and remote areas with patients presenting for the first time only when there is rapid deteoriation of kidney functions with onset of puberty.

In our study, glomerulonephritis (35.64%) was the commonest cause of CKD in children. Obstructive & Interstitial causes together comprised of 38.61% cases. Correctable causes of CKD like obstructive uropathy, reflux nephropathy together accounted for a majority of these cases in our study. Unlike in developed countries, where early antenatal detection of congenital anomalies and prompt surgical correction is done, diagnoses and hence intervention were late in our setup. Earlier detection and treatment would have prevented their progression to chronic renal failure. In a recent NAPRTCS report(2014) congenital causes, including congenital anomalies of the kidney and urinary tract (CAKUT) (15.8%), obstructive uropathy (15.3%), FSGS (11.7%), Reflux nephropathy (5.1%) and chronic Glomerulonephritis (3.1%) were the five most common causes.[17]In 18.8% of the patients, the etiology couldn't be identified from clinical history and investigation as they presented late.

All patient had identifiable clinical features with common presentation being oligoanuria, edema and voiding dysfunction. Anaemia was very common, seen in 74 children with a mean Hb of 6.4gm/dl (±2.1). 45% of children with CKD were found to be anaemic in the CKiD cohort, with a more rapid decline as GFR fell below 43ml/min/1.73m² at a rate of -0.3g/dl per 5ml/min/ 1.73m².[16,18]In our study, hypertension was found in 58 children. The North American Pediatric Renal Trials and Collaborative Studies' chronic renal insufficiency database had hypertension in 48% of the enrolled children and also demonstrated that it plays a role in progression of CKD in children.[19]Various studies have found prevalence of hypertension in children with chronic kidney disease (CKD) to be more than 50%.[20,21] The risk of hypertension is more closely associated with the type of underlying disease than with the degree of renal insufficiency; children with acquired glomerulopathies or polycystic kidney disease tend to have higher blood pressure than patients with renal hypoplasia and/or uropathies. The results of ESCAPE trial shows that intensified blood-pressure control delays the progression of renal disease in children with chronic kidney disease who receive a fixed high dose of an ACE inhibitor.[22]

In our study a majority of the patients (41.6%) were lost to follow up, which may be due to financial constraints , as patient attendant themselves had to bear the expenses in absence of any state funding. 22 children were undergoing conservative therapy, 12 patient were getting maintenance haemodialysis and 8 had undergone live-related renal transplantation, till last record 6 of the post-transplant patients were doing well with a functioning allograft. 2 patient expired due to infection with functioning allograft.

We conclude from our study that, Glomerulonephritis is still the most common cause of CKD in our children. At the same time obstructive and interstial nephritis comprises a big subgroup,

which can be easily prevented by detection and aggressive intervention at an early stage. Most of the children carry poor prognosis in view of their late presentation. Also majority of the children were unable to undergo any effective therapy and were lost to follow up in view of limited availability and high cost of therapy. Further studies to understand the epidemiology, causes and progression of ckd in children can help in delaying the onset of ESRD and hence the need for renal replacement therapy. This will also help in formulating health policy and allocation of limited resources.

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Contribution of authors: I (We) declare that this work was done by the author(s) named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

Ethical clearance: Taken

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ORIGINAL PAPER

Comparison of Spot Urine Protein-Creatinine Ratio With 24-hour Urine Protein in Glomerular Disease

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ABSTRACT

***Background:** The protein/creatinine (P/C) ratio in urine samples has been used in the clinical management of patients with glomerular diseases. The aim of this study is to evaluate the correlation between the Spot urinary Protein/Creatinine ratio and 24 hour urinary protein in patients with glomerular disease. **Methods:** It was a single centre, cross sectional study, conducted in Gauhati medical college and Hospital from July 2013 to June 2014. Patients admitted in department of nephrology due to glomerular disease were included for study. The relationship between the urine P/C ratio and the 24-hour protein excretion was assessed with the Pearson's correlation test. **Result:** A total 70 patients were enrolled for the study. Among them, 27 were males. The mean age of patients was 35.47 ±10.96 years. The most common glomerular disease was Systemic Lupus Nephritis (SLE, 25 cases). There was a significant correlation between 24 hour urine protein and spot urine protein ratio (P/C) ratio (correlation coefficient = 0.93, P < 0.001). **Conclusion:** This cross-sectional analysis corroborates the findings of previous studies, supporting the use of the spot urine protein ratio (P/C) ratio as an accurate test to define critical levels of proteinuria in patients with glomerular diseases.*

***Keywords:** Glomerular Disease, Proteinuria, Spot urine protein/ creatinine ratio*

INTRODUCTION

Proteinuria is a well-known marker for renal disease.[1] It is the most important test for both the initial evaluation and follow-up of patients with glomerulopathies. Dipstick tests are not clinically useful, since they have a low specificity and sensitivity for the detection and quantification of proteinuria.[2] Urine protein can be measured in random samples, in timed or untimed overnight samples, or in 24 hour collections. Protein excretion in a 24-hour urinary collection remains the reference (gold standard) method but subject to error due to over collection or under collection of urine. An alternative method for quantitative evaluation of proteinuria is the measurement of protein-to-creatinine ratio (PCR) in an untimed spot urine specimen, which provides a more convenient method to assess protein excretion.[1]

There is a high degree of correlation between 24-hour urine protein excretion and protein/creatinine ratios in random, single-voided urine samples in patients with a variety of kidney diseases.[3] It has been suggested that a protein/creatinine ratio of more than 3.0 or 3.5 mg/mg or less than 0.2 mg/mg indicates protein excretion rates of more than 3.0 or 3.5 g/24 hours or less than 0.2 g/24 hours, respectively.[3] However, only few studies have systematically examined the sensitivity and specificity or defined optimal levels of detection for protein/creatinine ratios in large numbers of patients with glomerular disease.

So, the purpose of this study is to evaluate the correlation between the Spot urinary Protein/Creatinine ratio and 24 hour urinary protein in patients with glomerular disease.

MATERIAL AND METHODS

It was a single centre, cross sectional study. Patients admitted in department of Nephrology from July 2013 to June 2014 with various glomerulopathies, were enrolled for study. Patients with age between 18 and 60 year, eGFR > 60 ml/min/1.73 m^2 (calculated from MDRD study equation, four-variable) and with proteinuria 1+ and above in urine by dipstick method were included for

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study. Those patients with eGFR < 60 ml/min/1.73 m^2, with febrile illness, urinary infection and gross hematuria and not giving consent for study were excluded.

Urine collection method was explained in detail to the patients to collect 24h and spot urine. All the subjects were instructed to begin the 24 hour collection immediately after completion of the first voiding in the morning and to collect all urine for 24 hours, including the final void at the completion of the 24 hour period. After discarding the first urine of the next day (which was included in the 24-hour urine sample), 3-5ml of urine was collected in the second sample for calculating the P/C ratio, which was calculated by dividing the proteinuria (mg/dl) of urine creatinine (mg/dl). Measurements on the 24-hour urine sample and spot urine protein & creatinine were performed on the same day as collections were completed. The adequacy of the 24-hr urine collection was assessed by comparing the total urinary creatinine in the sample with the predicted creatinine.

Creatinine concentration (mg/dl) was determined on a Vitros 350 Chemistry System (Ortho Chemical Diagnostic) with the modified Jaffe method. Protein concentration (mg/dl) was determined with a Vitros 350 Chemistry System Analyzer (Ortho Chemical Diagnostic) by biuret colorimetric assay. The urine protein: creatinine ratio was obtained by dividing the urinary protein concentration by the urine creatinine concentration (as this results in a ratio rather than an absolute number, SI units have not been used). Glomerular filtration rates (GFR) were calculated by the modification of diet in renal disease (MDRD – four variables) equation.

Statistical analysis: The correlation between P/C ratio in spot urine samples and urinary protein excretion in 24-hour collections were analyzed. The relationship between the urine P/C ratio and the 24-hour protein excretion was assessed with the Pearson's correlation test. Descriptive statistics were used for demographic and baseline data and summarized as mean ± standard deviation and percentage, where appropriate. A *p* value less than 0.05 were considered significant. The SPSS software (Statistical Package for the Social Sciences, version 19.0, SPSS Inc, Chicago, Ill, USA) and the Analyse-it software (version 9.60) were used for the analyses.

The study protocol was reviewed and approved by institutional ethics committees and patients written consents were obtained.

OBSERVATION AND RESULLT

A total of 70 patients were enrolled for the study. The mean age of the patients in the study was 35.47 ±10.96 year (19-59 year). Among the 90 patients who presented with proteinuria, 27 patients (38.5%) were male and 43 (61.50%) were female. The male to female ratio was 0.63:1. Regarding the distribution of glomerular disease (primary or secondary), the most common cause of proteinuria was Systemic Lupus Nephritis (SLE, 25 cases), followed by Focal and Segmental Glomerulosclerosis (FSGS, 19 cases). The mean serum creatinine value of study population was 0.89±0.2 mg/dl. The mean eGFR was 92.59 ±28.96 mL/min/1.73m^2 (calculated from MDRD Equation). The mean 24 hour urinary protein of study population was 5.71 ±5.0 gm/day (0.43 to 19.6 gm/day). The mean Spot urine protein/creatinine (P/C) ratio was 5.57 ±5.37 (0.4 to 24.07). Table 1 shows demographic and laboratory characteristics of the patients.

Table 1 Demographic and laboratory data at presentation

Baseline Characteristic and Investigation	
Total number of Patients	70
Age (year, mean ± SD)	35.47 ±10.96
Male : Female Ratio	0.63:1.0
24 hr Urinary Protein (gm, mean ± SD	5.71 ±5.0
Protein/Creatinine Ratio (mean ± SD)	5.57 ±5.37
eGFR (ml/min/1.73m2)	92.59 ±28.96
Distribution of Glomeruler Disease (Number, %)	
FSGS	19 (27.15)
MGN	17 (24.29)
SLE	25 (35.71)
DN	9 (12.85)

The correlation coefficient (r) between 24 hour urine protein and spot urine protein ratio (P/C) ratio was 0.93 (0.87- 0.96, 95% CI) that is strategically significant (p < 0.001)[Fig 1].

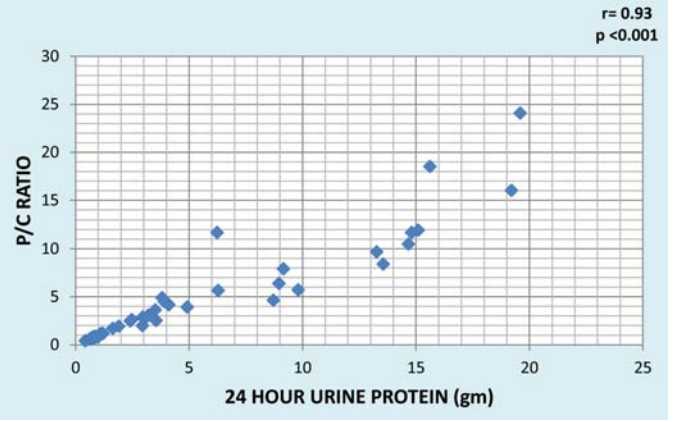

Figure 1 Scatter diagram showing correlation between 24 hour urine protein and spot urine P/C ratio among the entire samples (N=70)

DISCUSSION

An increase in urinary protein excretion is a widely accepted tool in the detection, diagnosis, and management of people considered to be at risk of developing renal disease and has been advocated as part of a regular check-up in such individuals.[4] The origins of this recommendation lie in the fact that, it is widely believed that there will be a change in the amount of protein excreted before any demonstrable change in glomerular filtration, for example, as reflected in the creatinine clearance.[5]

It is acknowledged that estimation of urinary protein excretion over a 24-h period is the reference, or gold standard method. This approach, however, is considered to be impractical in some circumstances, particularly in the outpatient setting, because of the difficulties associated with obtaining a complete collection. In a study of elderly patients, Mitchell et al.[6] had to discard

H”20% of the samples returned because they were considered to be incomplete. The need for a 24-h collection is a result of the high degree of variation in the urinary protein concentration during the course of the day. This variation in protein excretion is thought to be attributable to several factors, including (a) variation in water intake and excretion, (b) rate of dieresis, (c) exercise, (d) recumbency, and (e) diet. The variation may be further exacerbated by pathologic changes in blood pressure and renal architecture. This precludes the use of a shorter collection period or the use of a random urine sample for protein concentration measurements, a more practicable approach.

An alternative approach is that of expressing the protein excretion in a random urine collection, as a ratio to the creatinine concentration. It is assumed that both the protein and creatinine excretion rates are fairly constant during the day, as long as the glomerular filtration rate remains constant, and that is the major reason for changes in the protein concentration in individual samples during the day is variation in the amount of water excreted.[7] To support this proposal, several investigators have demonstrated a smaller variation in the protein/creatinine ratio compared with the protein concentration alone in urine samples collected throughout the day and found that the mean intra-individual variation in the protein/creatinine ratio was 38.6%, whereas that of the protein excretion was 96.5%. Koopman et al.[8] had made a similar observation.

When treating patients with glomerulopathies, with or without nephrotic syndrome, the clinical goal is to normalize or at least to reduce proteinuria. Therefore, in clinical practice the absolute level of proteinuria in individual measurements is less important than its modification and reproducibility over time as a result of therapeutic interventions. In this context, assuming that reproducibility of the P/C ratio since initial diagnosis is adequate, it can be said that significant reduction in the P/C ratio means reduction in protein excretion, even if absolute values cannot be estimated with optimal accuracy[4]. For detection of these levels of proteinuria, the P/C ratio presented a high level of accuracy. Two previous studies[9,10] used the P/C ratio cut-off values of 0.2 and 3.5 in patients with various nephropathies and stable renal function to establish the diagnosis of pathologic proteinuria (P24 e”0.2 g) and nephrotic range proteinuria (P 24e”3.5 g), respectively. Our study also suggest a strong correlation ($r = 0.93$, $p<0.001$) between the P/C ratio and 24 hour protein like other previous studies. Our findings are in support to use of spot urine P/C ratio in clinical practice due to the simplicity of collecting the sample and its low cost.

Main limitation in our study is the number of patients studied, since it was less, sub-group analysis based on patient age, gender and the level of renal function (represented as eGFR) was not done. Increasing the number of samples collected and perhaps stratifying by underlying kidney disease would help us to acquire a better knowledge of the correlation between the two techniques studied.

CONCLUSION

The study concluded a good correlation between the results of 24 hour urine protein and spot urine protein/creatinine (P/C) ratio in assessment of proteinuria for patients with glomerular diseases. Thus, the random urine measurement might reduce the numbers of unnecessary 24-h urine collections and their associated unreliability. Future studies with large sample size, focused on monitoring patients with proteinuria, can be useful for evaluating the efficiency of the P/C ratio in detecting and monitoring of the underlying renal disease.

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Contribution of Authors: We declare that this work was done by the author(s) named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors”. The first author and second author conceived, designed the study and third author analysed the data.

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A Study of Serum Amylase and Serum Lipase Activity in Chronic Alcoholics

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ABSTRACT

A case control study was undertaken in a tertiary medical care hospital to find out the significance of measurement of serum amylase and lipase activity as an indicator of chronic alcoholism. Out of total 100 subjects, 50 healthy individuals were taken as control group and 50 cases of chronic alcoholics with clinical manifestations of chronic alcohol abuse were taken as test group. The fasting plasma glucose (FPG), serum amylase, serum lipase, and serum gamma glutamyl transferase were estimated by colorimetric methods. The mean serum amylase, serum lipase, and serum gamma glutamyl transferase activities in control group and the test group were found to be 61.64+13.15U/L and 156.14+152.94 U/L; 61.84+14.07U/L and 268.48+175.13 U/L; 38.84+18.01 U/L and 170.5+110.88 U/L respectively with a significance of P<0.001. Mean fasting plasma glucose is found to be lower in the test group compared to the control group though both are within normal reference interval. The study suggests that serum amylase and lipase activities are increased in individuals with history of chronic alcohol abuse compared to normal individuals and can be used as markers of chronic alcoholism along with serum gamma glutamyl transferase activity.

Keywords: *Case control study, Amylase, Lipase, Gamma glutamyl transferase*

INTRODUCTION

Chronic alcoholism is a chemical/biological disease that is primary, progressive, chronic and fatal characterized by an incessant craving for increased tolerance of physical dependence upon and loss of control over drinking alcohol. It is a disease with a known pathology and an established bio molecular signal transduction pathway. The American Medical Association (AMA) had declared alcoholism as an illness in 1956. In 1991, The AMA further endorsed the dual classification of alcoholism by the International Classification of Diseases under both psychiatric and medical sections. Chronic alcoholism is primary since it is not related to another disease. It has its own diagnosis and own pathology. It is also a chemical disease because it breaks down differently in the stomach and has an entirely different effect on the brain of the alcoholic than on the non-alcoholic. It is biological in the sense that the chemical predisposition is inherited. Heavy alcohol use is one of the most common causes of both acute and chronic pancreatitis. While pancreatitis has been known to occur after a single episode of heavy alcohol use, prolonged heavy drinking is common in most cases. Acute alcoholic pancreatitis is characterized by the abrupt onset of abdominal pain, nausea, vomiting, and increased levels of serum or urine pancreatic enzymes.

Amylases are group of hydrolases that split carbohydrates having glucose monomers bonded by a-1,4 glycosidic linkage. It has two isomers – salivary (S) and pancreatic (P) amylases. Amylase is present in a number of organs and tissues. The greatest concentration is present in the pancreas (P – type), where the enzyme is synthesized by the acinar cells and then secreted into the intestinal tract by way of the pancreatic duct system. The salivary glands also secrete a very potent amylase (S – type) to initiate hydrolysis of starch in the mouth and oesophagus. The enzyme is also found in colostrums, tears and milk. The serum amylase concentration reflects the balance between the rates of amylase entry into and removal from the blood. Hyperamylasemia can result either from an increased rate of entry of amylase into the circulation and/or a decreased metabolic clearance of this enzyme. The pancreas and salivary glands have amylase

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concentrations that are several orders of magnitude greater than that of any other normal tissue, and these two organs probably account for almost all of the serum amylase activity in normal persons. A variety of techniques are now available to distinguish pancreatic from salivary-type isoamylase. Pancreatic hyperamylasemia results from an insult to the pancreas, ranging from trivial (cannulation of the pancreatic duct) to severe (pancreatitis). In addition, loss of bowel integrity (infarction or perforation) causes pancreatic hyperamylasemia due to absorption of amylase from the intestinal lumen. Hyperamylasemia due to salivary-type isoamylase is observed in conditions involving the salivary glands. In addition, this type of hyperamylasemia occurs in conditions in which there is no clinical evidence of salivary gland disease, such as chronic alcoholism, postoperative states (particularly postcoronary bypass), lactic acidosis, anorexia nervosa or bulimia, and malignant neoplasms that secrete amylase. Hyperamylasemia can also result from decreased metabolic clearance of amylase due to renal failure or macroamylasemia (a condition in which an abnormally high-molecular-weight amylase is present in the serum). Patients with abdominal pain and a markedly elevated serum amylase (more than three times the upper limit of normal) usually have acute pancreatitis, and additional serum enzyme testing is not helpful. Patients with smaller elevations of serum amylase often have conditions other than pancreatitis, and measurement of a serum enzyme more specific for the pancreas (pancreatitic isoamylase, lipase or trypsin) is frequently of diagnostic value in such patients.[1]

Lipase is an enzyme that catalyses the breakdown of triglycerides.[2] In addition to pancreatic acinar cells, lipase is found in the gastrointestinal tract, including the oesophagus, duodenum, stomach and colon.[2] Lipase has also been described in the liver, heart, lungs and leukocytes.[2,3] Pancreatic lipase content is approximately 100 times that of the small intestine and liver, and the pancreas to serum lipase concentration gradient is close to 20 000.[2]

Lipase levels may be increased in Acute pancreatitis, Perforated or penetrating peptic ulcer, Obstruction of pancreatic duct by stone, Drug-induced spasm of sphincter of Oddi, Chronic pancreatitis, Pancreatic pseudocyst, Pancreatic malignancy, Gastric malignancy or perforation, Acute cholecystitis, Small bowel obstruction, Intestinal infarction, Cystic fibrosis, Inflammatory bowel disease, Acute and chronic renal failure, Organ transplantation, particularly associated with a complication (organ rejection, cyclosporine toxicity, cytomegalovirus infection), Alcoholism, Diabetic ketoacidosis, Intracranial hemorrhage, Lymphoma, Chronic liver disease, and after endoscopic retrograde cholangiopancreatography.[4]

MATERIALS AND METHODS

The present study is a case control study on a group of 100 individuals equally divided into age and sex matched healthy non-alcoholics (controls) and alcoholics (cases or tests) taken randomly from different socioeconomic status. The study was conducted in the department of Biochemistry, Assam Medical College and Hospital, Dibrugarh, Assam in collaboration with various clinical departments. Control group consists of normal healthy individuals without any history or symptoms referable to disease of any system and who are non-alcoholics. Subjects of the test (case) group were amongst those who attended OPD as well as who were admitted in the neurology, medicine, surgery and psychiatry wards of Assam Medical College and Hospital with different types of clinical manifestations of chronic alcohol abuse.

Exclusion criteria of the test group:

a) Non-alcoholic liver disease

b) Diabetes Mellitus

c) Hyperlipidemia

f) Viral hepatitis

g) Cirrhosis of liver

h) Non-alcoholic pancreatic disease

i) Carcinoma of liver/pancreas

j) Drug induced liver disease

Following investigations were done:

(i) Serum amylase by kinetic colorimetric CNP-G3 method[5]

(ii) Serum lipase by colorimetric method described by Neumann et al[6]

(iii) Fasting Plasma glucose by hexokinase method[7]

(iv) Serum Gamma Glutamyl transferase by IFCC method[8]

RESULTS AND OBSERVATION

Age and sex distribution of the subjects: It was found that maximum numbers of cases in chronic alcoholic (test) group were in the age group of 31 – 40 years (48%) and this was followed by the age group of 41 – 50 years (28%). No case was found below 20 years and above 60 years of age. Out of 50 cases there were 45 males and 5 females. Male preponderance was observed with a ratio of 9:1.

Table 1 Age and sex distribution of the subjects

Variables		Test group (N = 50)		Control group (N = 50)	
		Number of cases	Percentage	Number of cases	Percentage
Age in years	21 – 30	7	14	2	4
	31 – 40	24	48	28	56
	41 – 50	14	28	16	32
	51 – 60	5	10	4	8
Sex	Male	45	90	42	84
	Female	5	10	8	16

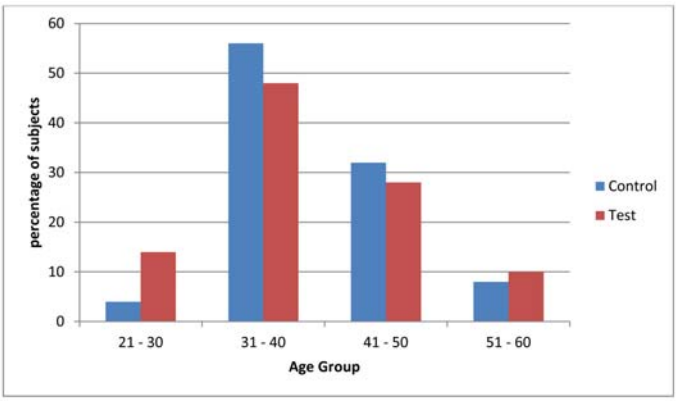

Figure 1 shows the age distribution of the control and test group

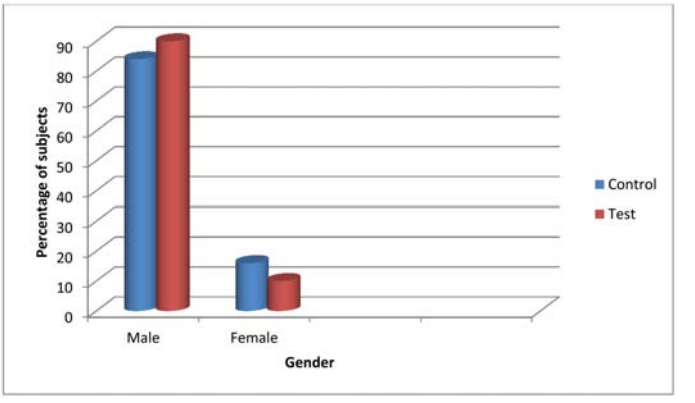

Figure 2 shows the sex distribution of the control and test group

Table 2 Range, mean and standard deviation (SD) of fasting plasma glucose, Serum amylase,Serum lipase and serum GGT in control and test subjects

Different parameters	Controls (No. 50)			Test (No. 50)			P – value
	Range	Mean	SD (±)	Range	Mean	SD (±)	
Fasting plasma Glucose (mg%)	74 - 109	92.58	9.61	61 - 238	84	28.61	Not significant
Serum amylase (U/L)	36 - 84	61.64	13.15	26 - 852	156.14	152.94	<0.001
Serum Lipase (U/L)	38 - 89	61.84	14.07	40 - 926	268.48	175.73	<0.001
Serum GGT (U/L)	14 - 82	38.84	18.01	20 - 642	170.5	110.88	<0.001

Table 2 shows that mean fasting plasma glucose in the control group were higher (92.58 mg%) than the test group (84 mg%) though both are within normal reference interval. Mean serum amylase activity in control group is lower (61.64 U/L) than the test group (156.14 U/L). Also mean serum lipase in control group is lower (61.84 U/L) than the test group (268.48 U/L). Mean serum GGT in control group is lower (38.84 U/L) than the test group (170.5 U/L).

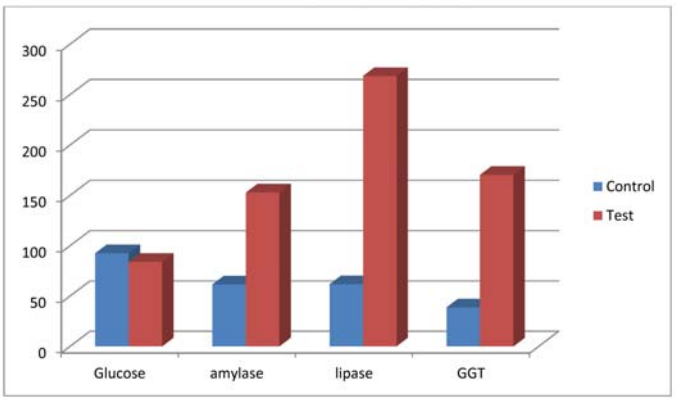

Figure 3 shows the statistical difference in parameters FPG, serum amylase, serum lipase and serum GGT between control and test group

DISCUSSION

In the present study, highest number of cases were found in the fourth decade that is between 31 – 40 years (48%) followed by fifth decade that is between 41 – 50 years (28%). Wilsnack RW et al[9] found men and women in three age groups (18–34, 35–49, 50–65) showed the prevalence of drinkers, former drinkers, and lifetime abstainers; and the prevalence of high-frequency, high-volume, and heavy episodic drinking among current drinkers. It is also found that among 50 numbers of chronic alcoholics, 45 were males and 5 were females with a male preponderance of 9:1. The findings regarding the gender distribution of alcoholism is similar with the study by Wilsnack RW et al.[9]

Fasting plasma glucose is found to be within normal reference interval in both the control (92.58 mg%) and test (84 mg%) groups. The mean serum amylase is found to be higher in test group (156.14 U/L) when compared to control group (61.64 U/L) with a P value of <0.001. d'Emden et al found hyperamylasemia in asymptomatic alcoholics.[10]

Pelletier G et al[11] studied the prevalence of hyperamylasemia in 100 patients with chronic alcoholism. Moderate hyperamylasemia was found in 15 patients. After one week of hospitalization, serum amylase was still elevated in 11 of 14 alcoholic patients. Hyperamylasemia was due to an increase in the isoamylase P in 5 cases, in the isoamylase S in 7 cases, and in both forms in 3 cases. Activities of serum lipase and isoamylase P were roughly parallel. Only two out of 8 patients with elevated isoamylase P had chronic pancreatitis. The salivary origin of elevated isoamylase S was suspected in only one out of 10 patients. This work shows that the origin of moderate hyperamylasemia, observed in alcoholic patients, is often extrapancreatic. It is suggested that the dosage of serum lipase simpler than that of isoamylases, may be routinely used in chronic alcoholic patients for diagnostic purposes.

Maruyama K et al[12] found that in the group with abnormally high total serum amylase on admission, levels were decreased after abstinence. In patients with pancreatic disorders in this group,

abstinence leads to a decrease in total serum amylase, but in patients with no such disorders, total serum amylase increases temporarily due to increases in salivary isoamylase. In the group with normal total serum amylase on admission, levels increased sharply after abstinence, and both pancreatic isoamylase and salivary isoamylase contributed to the gains. In the group with low total serum amylase, a sharp increase of 2-fold or more was noted after abstinence, and a major contributor was pancreatic isoamylase. The ratio of urine amylase to total serum amylase gradually declined, indicating clearly that abstinence led to a decrease in the excretion of amylase in urine.

The mean serum lipase activity in the test group (268.48 U/L) is higher than the control group (61.84 U/L) with a P value of <0.001. According to Gumaste VV et al[13], using an elevated serum amylase level to diagnose acute pancreatitis in an alcoholic patient with abdominal pain may not be appropriate, because hyperamylesemia is common in asymptomatic alcoholics without acute pancreatitis. To determine whether serum lipase also suffers from the same drawback, they undertook a prospective study involving 202 asymptomatic alcoholics admitted to the detoxification unit of their hospital. Sixty-six of the 202 patients had serum lipase levels above the normal range (0-213 U/L). Of these 66, 55 (83%) had levels that were one to two times normal, while 11 patients had levels ranging between two and three times normal. No patient exceeded three times the normal level. This background information is important in the interpretation of serum lipase levels in alcoholic patients with abdominal pain.

Pezzilli R et al[14] found that Among occasional drinkers, serum amylase levels were abnormally high in 6 subjects (13%), whereas serum pancreatic isoamylase and lipase were abnormally high in one, (2%). In chronic alcoholics without abdominal pain serum amylase and lipase were abnormally high in 10 subjects (14%) but serum pancreatic isoamylase in only 7 (10%). In patients with acute alcoholic pancreatitis, serum amylase and pancreatic isoamylase were abnormally high in 16 of the 17 patients (94%), whereas serum lipase was abnormally high in all.

The mean serum GGT in the test group (170.5 U/L) is found to be higher than the control group (38.84 U/L) in the present study. Ishii H et al[15] also got a similar finding. His findings suggested that enhanced hepatic and intestinal GGT activities may contribute, at least in part, to an increased level of serum GGT frequently seen in chronic alcoholics.

CONCLUSION

It has become evident from the above discussions that though a variety of factors influence the serum concentrations of amylase and lipase, chronic ethanol abuse having a profound effect on almost all the organs of the body, contributes greatly into increase in the levels of these two enzymes in the general circulation.

On the light of all foregoing observations and discussions along with the statistical evaluations, it is established that serum amylase and lipase activities are definitely increased resulting in a higher lipase to amylase ratio in the chronic alcoholics and present the affirmative conclusion that serum amylase and lipase are altered with a fixed proportion under chronic ethanol abuse but is still insufficient to directly link any definite organ or system under the observed changes. A further prospective study would be helpful to evaluate the exact contribution of chronic ethanol abuse responsible for this clinical chemical constellation, especially in patients without abdominal pain, as multiple factors and conditions can lead to a state of hyperamylasemia and hyperlipasemia.

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ORIGINAL PAPER

Erythrocyte Plasma Membrane Redox System, Plasma Vitamin C and Protein Carbonyl in Carcinoma Cervix Patients

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Rout Jayanta Kumar[4], Ghosh Debdutta[5], Sarkar Chandan[6]

***Received** on September 10, 2016**; editorial approval** on November 09, 2016*

ABSTRACT

Introduction: *Though cervical cancer is a multi-factorial disease, the importance of oxidative stress in the pathogenesis cannot be underestimated.* ***Methods:*** *40 cervical cancer patients (10 patients of each stage) and 40 age matched female controls were recruited for the study. Plasmaascorbate, protein carbonyl and erythrocyte plasma membrane redox system (PMRS) were studied in each subject.* ***Results:*** *Compared to controls plasma protein carbonyl and erythrocyte plasma membrane redox system are significantly higher and plasma ascorbate is significantly lower in cervical cancer.* ***Conclusion:*** *For the first time we have showed significant increase of erythrocyte PMRS activity in cervical cancer to mitigate oxidative stress in the body.*

Keywords: *Carcinoma cervix, protein carbonyl, PMRS activity,*

INTRODUCTION

Carcinoma cervix is a very common and dangerous clinical entity affecting women in the developing countries, though it is multi-factorial disease, the importance of oxidative stress in the pathogenesis of disease cannot be undermined.[1] Distant metastasis involving lung, liver, bone, and supraclavicular lymph nodes is the most common feature of patients suffering from carcinoma cervix though the incidence of cancer cervix has reduced in India during the last two decades.[2]

The reactive oxygen species (ROS) damage cellular architectures. Carbonyl groups formed as a result of protein oxidation by ROS. Protein carbonyl level in tissues and plasma is relatively stable marker of oxidative damage.[3] Collectively, these ROS can lead to oxidation of amino acid residue side chains, formation of protein-protein cross-linkages, oxidation of the protein backbone resulting in protein fragmentation and peptide bond cleavages.

As per A. D. N. J. de Grey the term "plasma membrane redox system" is used to denote the machinery by which cells oxidise electron donors, typically NADH and/or NADPH, and transfer the resulting electrons to extracellular acceptors.[4] The basic structure of PMRS includes the following entities–The intracellular electron donor species, electron carrier proteins & oxido-reductases, & extracellular electron acceptor.[5] The PMRS reduces extracellular oxidants by using the reducing power of intracellular antioxidants, making the cell metabolism respond to changes in the local redox environment.[6] One of the main electron donor species of PMRS is ascorbate.

Vitamin-C plays an important role in protecting the cells against oxidative stress and readily scavenges ROS, RNS, singlet oxygen and hypochlorite. Different stages of cancer cervix can be associated with a decrease in Vitamin-C.[7]

Keeping the facts in mind, this study aims to evaluate the erythrocyte PMRS activity, Plasma protein carbonyl, and plasma ascorbate in carcinoma cervix patients.

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MATERIALS AND METHODS

***Cases*:** All carcinoma cervix patients (prior to surgery, chemotherapy and/or radiotherapy) attending G&O-OPD and RT-OPD of R.G.Kar Medical College & Hospital in the specified period of 1yr were recruited. All patients meeting at least one of the following criteria were excluded from the study population- patients unwilling to sign consent form, pregnancy & lactation, malignancy other than carcinoma cervix, Diabetes Mellitus, major chronic illness like- TB, nephrotic syndrome, uremia especially treated with hemodialysis (not related to carcinoma cervix), other conditons where high oxidative stress are evident – infertility, abortion, fibroid, infection etc.

***Control population*:** Equal number of age& sex matched control subjects were also taken.

Chemicals: Metaphosphoric acid and Diphenylphenanthrolinesulphate (DPPS) are purchased from Sigma. Rests of the chemicals are from Sisco research Ltd. or Merck India Ltd. All chemicals are of AR grade. *Blood Collection Protocols*- 5ml of heparinised blood (10U heparin/ml) was collected aseptically after venepuncturefrom 40 carcinoma cervix patients and 40 age & sex matched control subjects. Heparinised blood was centrifuged at 3000 rpm for 5 minutes. Plasma was collected separately for Vitamin-C and protein carbonyl estimation. Blood cells were washed thrice with 0.9% NaCl solution and buffy coat was removed.

Methods: Plasma protein carbonyl was measured as per Levine's method (8) based on the spectrophotometric detection of the reaction between 2, 4-dinitrophenol hydrazine (DNPH) with Protein Carbonyl to form protein hydrazone. Plasma Vitamin-C was measured spectrophotometrically.[8] In this assay - ascorbic acid in plasma is oxidized by Cu++ to form dehydroascobic acid, which reacts with acidic 2,4-DNPH to form a red bis-hydrazone. This bis-hydrazone is measured at 520nm wavelength.[9] The methodology of measurement of PMRS activity wasferricyanidereduction test using DPPS (as described by Avron&Savit).[10] as used by Rizvi & Maurya.[11] Total plasma protein level was assessed by automated analyser (ERBA XL-600) using commercially available kit from ERBA (TransasiaBiomedicals Ltd., using Biurate method).

Statistical Analyses: The quantitative data of erythrocyte PMRS, plasma Vitamin-C & protein carbonyl were evaluated whether they followed the normal distribution or not. For parametric data, unpaired t-test for independent variables was performed between case & control. Pearson's correlation co-efficient was applied for assessment of interrelationship between RBC PMRS, plasma protein carbonyl & Vitamin-C level. All p-values were two-sided and less than 0.05 was considered a statistically significant difference. SPSS-20 software was used.

RESULT

RBC PMRS activity (µ mole Ferrocyanide/ml Packed RBC/30min.), plasma protein carbonyl (nanomole/mg of total protein), and plasma Vitamin-C level (mg/ml) of cases & controls are shown in **table 1**.

Table 1 Table showing mean and S.D. of RBC PMRS activity, Plasma protein carbonyl & Plasma Vitamin-C of cases & control population

Parameter	Cases	Controls	p-value
RBC PMRS activity(µ mole Ferrocyanide/ml Packed RBC/ 30min.)	6.19 ± 0.98	2.75 ± 0.69	< 0.001
Plasma protein carbonyl (nanomole/mg of total protein)	5.25 ± 1.56	1.54 ± 0.30	< 0.001
Plasma Vitamin-C level (mg/ml)	0.24 ± 0.04	0.33 ± 0.02	< 0.001

The table shows all three tests parameters vary significantly in cases of carcinoma cervix &age matched controls. Correlation between PMRS activity of RBC and other two variables (plasma Vitamin-C & protein carbonyl) were non-significant in carcinoma cervix. However, statistically significant negative correlation between protein carbonyl and Vitamin-C level was noticed (Pearson's correlation coefficient r-value is -0.941).

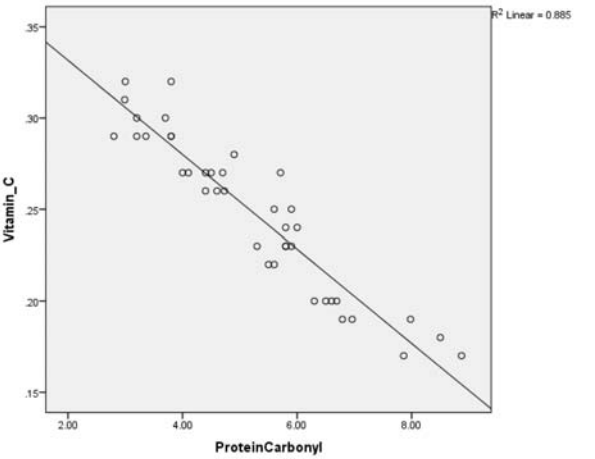

Figure 1 Scattered diagram correlation between Protein carbonyl and Vitamin-C in cases

DISCUSSION

The property of erythrocytes to reduce membrane impermeant anions was reported by Orrienger & Roer.[11] This plasma membrane redox system (PMRS) helps the cells to respond to the redox changes, thereby regulating many cellular functions – cell metabolism, ion channels, growth & death. But perhaps its most important role, especially in the nucleus- free mature erythrocyt is that it acts as a redox sensor. The PMRS reduces extracellular oxidants by using the reducing power of intracellular antioxidants, making the cell metabolism respond to changes in the local redox environment. Although the exact physiological functions of PMRS is not fully understood, proposed functions include maintenance of redox state of sulfhydryl residues in membrane proteins, neutralization of oxidative stressors outside the cells, stimulation of cell growth, recycling of alpha tocopherol, reduction of lipid hydro-peroxides, the maintenance of the extra

cellular concentration of ascorbic acid, and reduction of ferric ions prior to iron uptake by a transferrin-independent pathway.[12] Besides this, RBCs encounter a large load of oxidants throughout their life span. Recent studies show that- PMRS plays important role in protection against oxidative stress in human ageing, type-2 Diabetes Mellitus, uraemia, chronic haemodialysis etc.[5, 12-15] In our study we also obtained significant PMRS activity of RBC in carcinoma cervix patients compared to controls. This indicates presence of oxidative stress.

Protein carbonylation is a key determinant of oxidative stress.Primary modifications occur in metal-catalyzed oxidation.[16] Direct oxidation of Lysine, Histidine, Cysteine, Methionine.[17] side chain residues of protein backbone occurs. Secondary modifications occur when proteins are modified by molecules generated by oxidation of other molecules. Carbonyl groups in tissues and plasma is relatively a stable marker of oxidative damage. Many diseases areassociated with increased protein carbonylation including- acute/adult respiratory distress syndrome, amyotrophic lateral sclerosis, Alzheimer's disease, Diabetes mellitus, cystic fibrosis, dementia with Lewy body, Parkinson's disease, psoriasis, rheumatoid arthritis, systemic amyloidosis etc.[18] Protein carbonylation recently has been linked to epigenetic processes via carbonylation of lysine groups on histones and via carbonylation of class I and II histone deacetylases. Both types of modifications may affect gene expression.[19]

Ascorbate is an important water soluble, chain-breaking antioxidant.Some studies also concluded that antioxidants like Vitamin – C level of plasma in most of the Ca-Cx patients were lower than normal. Antioxidant supplementation showed to be effective in reducing oxidative stress in proteins.[20] In table-1, results of our studied parameters strongly indicate presence of oxidative stress. In figure-1, correlation between ascorbate& protein carbonyl showed inverse relationship. This suggested that oxidative stress led to increased consumption of ascorbate and protein carbonyl concentration increased. However, PMRS activity did not correlate significantly with plasma protein carbonyl or ascorbate. This may be due to the following factors-small sample size, low ascorbate level in carcinoma cervix (ascorbate is one of the main factor for optimum PMRS activity), and PMRS activity is also a function of age.

CONCLUSION

For the first time we have shown that PMRS activity of human RBC increases in carcinoma of cervix & statistically significant negative correlation exists between plasma protein carbonyl & plasma ascorbate.Considering the fact that erythrocytes face oxidative stress continuously this study aims to throw light on this very important aspect of protein carbonylation in the aetiopathogenesis of various diseases.Carbonyl groups being stable markers of oxidative damage they can serve as candidates of pharmacological targets in future.In background of protein carbonyls being involvedin epigenetic processes this can have a possible role in prevention of serious debilitating diseases.Again ascorbate being a very important parameter in maintainance of redox milieau of human physiological system,this study can prove to be relevant in reduction of oxidative stess and its consequent damages.Involvement of a larger numbe of cases in a longer time frame is required to establish the aim of the study on a broader perspective.

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Research involving human participants and/or animals: Human participant were taken

Consent of participation: All the participants were informed about the details of the study and written consent was taken from each of them.

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Seroprevalence of Chikungunya Cases in a Tertiary Care Hospital of Assam

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ABSTRACT

***Objectives**: To determine the prevalence of Chikungunya cases and to correlate the clinical symptoms of Chikungunya with serological findings in patients attending Gauhati Medical College and Hospital. **Material and Methods**:The study was carried out among 866 clinically suspected Chikungunya cases presenting with fever, headache, retro-orbital pain, back pain and arthralgia and the sample were tested for Chikungunya virus specific IgM antibodies, in the Department of Microbiology, Gauhati Medical College and Hospital. Detection of CHIK V IgM antibodies in serum of all subjects was carried out by ELISA kits procured from NIV, Pune. Age, sex wise distribution and the period of peak incidence of the positive cases was studied. **Result**: In the study, the seroprevalence of Chikungunya among the suspected cases was 9.93%. The prevalence of Chikungunya infection according to clinical symptoms were 97% fever, 67.44% headache, 30.23% retro-orbital pain, 30% back pain, 22% arthalgia. Gender wise distribution showed male and female ratio to be 2.7:1.The metro population were infected more than the rural population. The maximum number of seropositive was seen among Kamrup Metro followed by Barpeta. The peak season was in the month of September and in the 30-39 age group. **Conclusion**: Chikungunya is a newly emerging viral infection which had spread to new areas during this outbreak. Hence it is essential to have a proper diagnostic laboratory support, proper surveillance system and public awareness in order to prevent future epidemic in this region.*

***Keywords**: Chikungunya; Capture linked immunosorbant assay, seropositivity*

INTRODUCTION

Emerging viral infections have become a serious problem in recent years. Emergence or re-emergence of severe arboviralhemorrhagic fevers caused by mosquito borne viruses, such as dengue virus and Chikungunya (CHIK) virus, have been frequently reported in the Indian subcontinent in the past few years. Chikungunya is an emerging viral illnessin the majority of people presenting with fever, headache, myalgia, retro-orbital pain, backache, rashes and severe arthralgia. Since from clinical perspective the clinical manifestation are almost similar and it is very difficult to distinguish from one another. As the outcome of these infections vary on the basis of the infecting agent where the mortality rate of dengue is high. There is therefore a need for a means of definitive diagnosis and identification of the viral agent.[1]

The species chikungunya belongs to *Alpha virus* genus which consists of 28 viruses.[2,3] Chikungunya virus is serologically classified as a member of the Semliki Forest antigenic complex.[4] The disease is transmitted predominantly by *Aedesaegypti, Ae. albopictus*and*Ae. Polynesiensis*are commonly involved in the transmission although *Culex*mosquitoes has also been reported for the transmission in some cases, the same species involved in the transmission of dengue.[2,5]

The symptoms are most often clinically indistinguishable from those observed in dengue fever. Indeed, the simultaneous isolation of both dengue and Chikungunya from the sera of the same patients has previously been reported, indicating the presence of dual infections. In 2010, a hospital-based study revealed co-circulation of Chikungunya virus and Dengue virus in some areas of West Bengal, India with high morbidity.[6] It is, therefore, very important to clinically distinguish dengue from Chikungunya infection. A definitive diagnosis of Chikungunya infection can be made only with the aid of laboratory support

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since clinically, symptoms resemble those of dengue fever.[7] As the outcomes of these infections vary on the basis of the infecting agent, they pose a diagnostic dilemma for the clinician. Laboratory diagnosis is therefore critical to establish the differential diagnosis.[7] Therefore our aim and objective is to determine the prevalence of Chikungunya cases and to correlate the clinical symptoms of Chikungunya with serological findings.

MATERIALS AND METHOD

The present study was undertaken to know the prevalence rate and correlation of clinical symptoms of Chikungunya with serological test IgM antibodies in patients attending Gauhati Medical College and Hospital during a period of one year from June 2013 to May 2014. During this period, a total of 866 samples were screened for IgMChikungunya antibodies from the clinically suspected cases of Dengue and Chikungunya. Special interest was given on clinical presentation, duration of illness, age, sex. Written inform consent were obtained from each patient.The study was a hospital based cross sectional study. IgMChikungunya ELISA antibody assay has been done on the serum samples of patients fulfilling the criteria of case definition. Permission was obtained to conduct the study from the Institutional Ethical Committee (IEC), Gauhati Medical College, Assam.

Inclusion criteria were the patients presenting with fever and arthralgia that are not explained by any other etiology, all the patients presenting with retro-orbital pain, rashes, severe headaches, myalgia, backache along with high or low grade fever typically lasting from several days up to a week,samples with clinically compatible illness from new geographical areas without active dengue circulation and Meningoencephalitis cases admitted in Gauhati Medical College and Hospital.Exclusion criteria were patients suffering from fever fever for less than 4 days , fever due to other etiological causes, and altered sensorium, seizure, swelling of legs, menorrhagia and pain abdomen which were not associated with Chikungunya infection.

Collection of samples: Under all aseptic and antiseptic condition, 5ml of venous blood was collected from the patient. Blood was allowed to clot and serum was separated by centrifuging at 3000 rpm in a centrifuge machine for 10 minutes. The samples were stored at -20 °C.

Serum samples of 866 of suspected Chikungunya cases were tested for Chikungunya specific IgM antibody by IgM Capture linked immunosorbant assay using IgMChikungunya ELISA kit procured from NIV Pune and all equivocal samples were tested with NOVALISA IgMμ-Capture ELISA, NOVATEC kit is produced by Novatech, Germany. The procedure that was followed was according to the kit insert.

Statistical analysis: Data was collected and entered in Microsoft office Excel and analyzed by using SPSS version 17 and graph pad. Description statistics were done for different study variables. Chi-square test and fisher's exact test was used for analysis of categorical vartiables. Criteria of significance was used in the study were $p<0.05$.

RESULTS AND DISCUSSION

Among all 866 suspected Chikungunya virus infected cases, most of the Chikungunya positive cases presented with symptoms of fever, headache, retro-orbital pain, back pain and arthralgia whereas fever, headache and arthralgia were the most common symptoms presented by Chikungunya negative cases. In our study, among all the 866 suspected Chikungunya cases 86 (9.93%) were found to be seropositive for Chikungunya by IgM ELISA.

Table 1 Demographic features of the IgM seropositive cases in GMCH in 2013

	VARIABLE	CHIK POSITIVE (%)	CHIK NEGATIVE (%)
AGE GROUP	Adult > 16 yrs	80 (93.02)	664 (85)
	Children 0-15 yrs	6 (6.97)	116 (14.87)
	P value	< 0.0492*	
GENDER	Male	63 (73.23)	528 (67.69)
	Female	23 (26.74)	252 (32.30)
	P value	0.329	
PLACE OF RESIDENCE	Metro	75 (87)	526 (67.4)
	Rural	11 (12.79)	340 (43.58)
	P value	< 0.0001*	
	Odd ratio	4.404 (CI 95% 2.307 to 8.421)	

*Fisher's exact test significant

The demographic table shows the prevalence of Chikungunya infection was more among the age group beyond 16 yrs and it was comparatively less among the children below 15 yrs of age and it was found to be statistically significant (p=0.0492). Gender distribution for Chikungunya infection was not found to be statistically significant and the male and female ratio was found to be 2.7:1. On comparing the occurrence of Chikungunya infection among metro and rural populations, it was found that the metro populations were infected more than rural population 87% vs 12.79%. Theodd ratio for metro occupants was 4.404 (95% CI: 2.307- 8.421) compared to rural and the p value was < 0.0001.

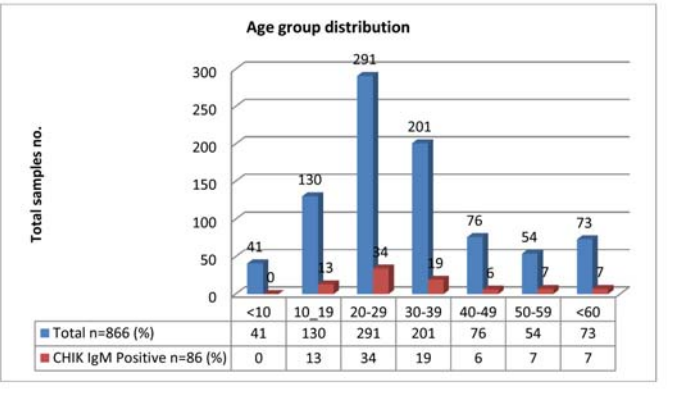

Figure 2 Shows the age distribution

The **Figure 1** shows the correlation of occurrence of Chikungunya infection with age wise distribution where the highest numbers of positive cases were seen in the age group of 20-29 (39.53%) followed by 30-39 (22.09%) and < 20yrs (15.11%) respectively. Chikungunya infected case was not seen below 10yrs of age.

Table 2 District wise distribution of Chikungunya virus infection in Assam

NAME OF THE DISTRICT	POSITIVE n=86	%	NEGATIVE n=780	%	TOTAL n=866	%
Kamrup Metro	75	87.2	526	67.43	601	69.39
Kamrup rural	0	0	94	12.05	94	10.85
Sivsagar	1	1.16	9	1.15	10	1.15
Golaghat	1	1.16	3	0.38	4	0.46
Nagaon	1	1.16	13	1.66	14	1.62
Bongaigaon	1	1.16	9	1.15	10	1.15
Barpeta	2	2.33	22	2.82	24	2.77
KarbiAnglong	1	1.16	3	0.38	4	0.46
Morigaon	0	0	11	1.41	11	1.27
Nalbari	1	1.16	27	3.46	28	3.23
Dhubri	0	0	15	1.92	15	1.73
Lakhimpur	0	0	9	1.15	9	1.04
Mangaldoi	0	0	7	0.89	7	0.81
Darrang	1	1.16	6	0.76	7	0.81
Dhemaji	0	0	6	0.76	6	0.69
Goalpara	1	1.16	8	1.02	9	1.04
Dibrugarh	0	0	5	0.64	5	0.57
Cachar	1	1.16	4	0.51	5	0.57
DimaHasao	0	0	3	0.38	3	0.35
Grand total	86	100	780	100	866	100

The maximum number of seropositive was seen among Kamrup Metro follower by Barpeta. Seropositive cases were not detected from the districts of DimaHasao, Dibrugarh, Dhemaji, Mangaldoi, Lakhimpur, Dhubri and Morigaon. Cachar, Goalpara, Darrang, Nalbari, Bongaigaon, Nagaon, Golaghat and Sivsagar districts detected only single seropositive cases each.

Table 3 Month wise distribution of Chikungunya cases in 2013

Month	No. Test done	Positive, n= 86 %	Negative, n= 780 %	X^2 P value
July	115	4 (4.65%)	111 (14.23)	0.0030**
August	142	8 (9.30)	134 (17.17)	
September	609	74 (86.04)	535 (68.58)	
Grand total	866	86	780	

** Significant

The **Table 3** shows that among a total of 866 clinically suspected Chikungunya cases, maximum numbers of seropositive cases were seen in the month of September followed by August and July which were found to be 86.04%, 9.30% and 4.65% respectively.

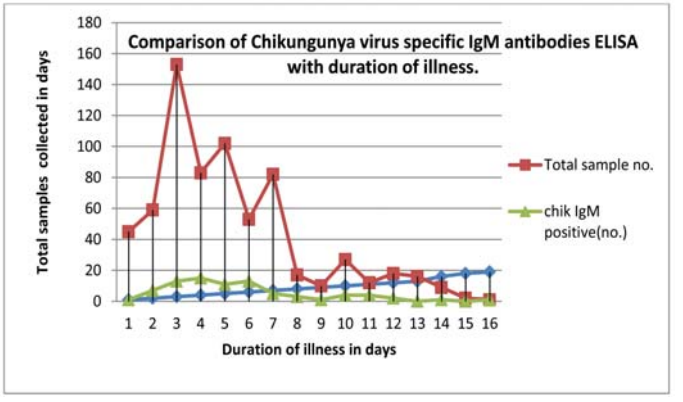

Figure 2 Comparison of Chikungunya virus specific IgM antibodies ELISA with duration of illness

Figure 2 depicts that on correlating the duration of illness with Chikungunya infection it was seen that maximum seropositivity was by 3 day of illness.

Table4 Seropositivity in relation to duration of illness

Duration of disease	IgM assay (86)
< 5 days	36 (41.86%)
5–10 days	33(38.37%)
10–20 days	12 (13%)

DISCUSSION

In our study, the seroprevalence of Chikungunya virus infection done by Chikungunya specific IgM antibody ELISA among the suspected cases were found to be 9.93% correlating to studies by Ravi at al[8] in contrast to the studies by Mahanty*etal*[9] Suryawanshi*et al*[10] and SaiGopal*et al*.[11] The low prevalence rate in our study may be due to the newly entry of the virus in this region although the presence of vector was reported from this region. More than 50% of the patients attending the hospital were before three days or after 6 days of illness where the sensitivity of IgM ELISA is comparatively low.[11] Another reason for low prevalence rate may be due to asymptomatic and mildness presentation of the disease in the young age group.

In our study,the prevalence of Chikungunya infection among the adult above 16 yrs of age showed the seropositivity rate to be 93.02% and the prevalence was comparatively less among the children below 15 yrs of age which was found to be statistically significant (p=0.0492) Vijayakumar*et al*[12] found Chikungunya infection more commonly in the adult age group.

Gender distribution for Chikungunya infection was not found to be statistically significant and the male and female ratio was found to be 2.7:1. The males were more affected than females because they go out for work at day time and get exposed to the vector Aedessp, which is domestic in nature and a day bite.

On comparing the occurrence of Chikungunya infection among metro and rural populations, it was found that the metro populations were infected more than rural population 87% vs 12.79%. The odd ratio for metro occupants was 4.404 (95% CI: 2.307- 8.421) compared to rural and the p value was < 0.0001. Debjani Taraphdar *et al*.[13] in their studyfound Urban populations (74.8%) were mostly infected than rural (25.2%) with a significant p value 0.001 whose findings are similar to our study.The reasons behind the increased infection rate of Chikungunya in Metro populations may be due to high density of Aedes mosquitoes with increasing urbanization which has lead to an abundance of mosquito breeding sites. Storage of drinking water and other urban water, containers including plant-pot bases, guttering, tarpaulins and tyres and discarded containers can all collect rain water and provide habitat for *Aedesaegypti*. Another point may be due to the highly populated areas along with existence of high density of Aedes mosquitoes in Metros which helps in easy transmission of Chikungunya virus from one viremic host to another.

In our study maximum numbers of positive cases were seen in the month of September, August and July which were found to be 86.04%, 9.30% and 4.65% respectively. Mahanty *et al* from Odisha, in their study reported more number of cases from the month of July to September and less during the month of January to March.[14]

The maximum number of seropositive was seen among Kamrup Metro followed by Barpeta. Ravi V in 2006 cited regarding the emergence of Chikungunya virus in India since its first isolation in Calcutta in 1963.[8] The last outbreak of chikungunya virus infection occurred in India in 1971. Reports of large scale outbreaks in Andhra Pradesh, Karnataka, Maharashtra, Orrisa. But no reports from the North east part of India.[15] P Dutta et al reported the first evidence of chikungunya virus infection in Assam, Northeast India during June-September 2008.[15] They also stated that the chikungunya positive patients did not travel to and from any endemic region confirming indigenous transmission. It was also the maiden report of chikungunya occurrence in Northeast India. M. Muniaraj reported that the entire North Eastern States such as Assam, Arunachal Pradesh, Manipur, Mizoram, Nagaland and Tripura excluding Meghalaya were not affected till this reporting. Although Jharkhand and Bihar were not affected till 2010, cases were seen 2011.[16] Resurgence of chikungunya is due to Urbanization, Increase in the mosquito population, Loss of herd immunity. As no active or passive surveillance carried out in the country and therefore, it 'seemed' that the virus had 'disappeared' from the Assam and the North east part of India.

CONCLUSION

Chikungunya is a newly emerging viral infection which had spread to new areas during this outbreak. Hence it is essential to have a proper diagnostic laboratory support, proper surveillance system and public awareness in order to prevent future epidemic in this region.

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ORIGINAL PAPER

Dexamethasone Cyclophosphamide Pulse Therapy in Pemphigus: A Retrospective Study of Factors Influencing Phase I

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ABSTRACT

Introduction*: The introduction of dexamethasone-cyclophosphamide pulse (DCP) therapy for management of pemphigus has significantly reduced the mortality and morbidity associated with the disease. Although it is well established that phase I of DCP is the primary determinant of the duration and outcome of treatment, there are very few studies regarding factors that influence this phase of therapy.* ***Objectives****: This study was undertaken to analyze the relationship between various factors and duration of phase I.* ***Methods****: A retrospective analysis of 40 patients of pemphigus on DCP was conducted.* ***Results****: Disease severity in pemphigus significantly prolonged the duration of phase I of DCP. Other factors such as age, gender, type of disease, or presence of oral lesions were found to have no significant effect on duration of phase I.* ***Conclusion****: The observations of our study aid in addressing the concerns and expectations of pemphigus patients being treated with DCP regarding probable duration and outcome of therapy and lead to better management of the patient, and the disease.*

Keywords: *Dexamethasone cyclophosphamide pulse therapy, pemphigus, phase I, pulse therapy*

INTRODUCTION

Pemphigus is a chronic autoimmune epidermal bullous disease caused by autoantibodies directed against desmogleins and desmosomal glycoproteins expressed on the epithelial cells of skin and mucosae, resulting in acantholysis. Mortality due to pemphigus, in absence of treatment, was as high as 90-100%.[1] The introduction of corticosteroids in its management significantly decreased the mortality to 25-45%.[2] The mortality has further reduced to less than 10% with the advent of adjuvant immunosuppressive agents.[3]

Dexamethasone-cyclophosphamide pulse (DCP) therapy, first designed by Pasricha and Gupta for use in pemphigus,[4] ushered in a revolution in pemphigus management. The DCP regimen is administered in four phases.[5] In phase I, dexamethasone 100mg is given intravenously dissolved in 500 ml of 5% dextrose over three hours on three consecutive days. Cyclophosphamide 500 mg is dissolved in the same infusion on the second day. The same cycle is repeated at interval of 28 days. The patient receives daily oral cyclophosphamide 50 mg between pulses. During this phase, the patient may continue to develop recurrences in between the pulse infusions and can then be given additional treatment, either daily oral corticosteroids or additional dexamethasone pulses every 2 weeks. After the skin and mucous membrane lesions have resolved completely and additional medications have been withdrawn, the patient is considered to have entered phase II. During phase II, the patient continues to receive pulses at 28 days intervals for 9 months along with 50 mg cyclophosphamide orally daily. In phase III, monthly pulses are stopped and cyclophosphamide 50 mg daily is continued for another 9 months. After this, the patient moves to phase IV, where treatment for pemphigus is withdrawn completely and the

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patient is followed up lifelong to look for any relapse. In case of development of any new lesion during phases II IV, the patient is restarted on phase I. DCP is a safe and effective therapeutic regimen and has made cure or permanent remission possible in more than 90% patients when the regimen is strictly followed.[6,7]

It is evident that phase I of DCP is variable from patient to patient and, as such, the primary determinant of the total duration of treatment required in an individual patient. In our experience, it was found that the length of phase I varied from as short as 3 months to as long as nearly 20 months. Therefore, this study was undertaken to delineate the factors that influence the duration of phase I, which seemingly have a direct bearing on the overall prognosis in a patient of pemphigus put on DCP.

MATERIAL AND METHODS

A retrospective study was conducted amongst 40 patients with a diagnosis of pemphigus who had undergone treatment with DCP between 2007 and 2015 at the Department of Dermatology, Assam Medical College & Hospital, Dibrugarh. The study observations are based upon a retrospective analysis of clinical data of these patients collected over a period of 7 years.

The data recorded for all patients included a detailed history (duration of disease, the type and distribution of lesions, associated symptoms and other diseases, course of illness and drug history) and a thorough clinical examination at first visit and on follow up. The diagnosis was made on clinical grounds and confirmed by positive Tzanck smear, supplemented by histopathology and direct immunofluorescence in almost all cases. The clinical severity of disease was recorded for all patients based on the number of skin lesions and disease was classified as mild (<15 skin blisters or erosions), moderate (15 to 30 skin blisters or erosions) and severe (>30 skin blisters or erosions or extensive confluent areas of erosion). Routine investigations such as complete haemogram, erythrocyte sedimentation rate, fasting and post prandial blood glucose levels, liver and renal function tests, serum electrolytes, urine analysis, baseline ECG, chest radiograph and ophthalmological examination for cataract and glaucoma were performed in all patients and results were duly recorded.

The study patients were administered the modified DCP treatment regimen.[5] Any concurrent illness and/or infections were treated appropriately without discontinuing the DCP therapy. Kaplan-Meier survival analysis was done on the data of those patients who had successfully completed phase I of DCP, and the p value was calculated using chi-square test.

RESULTS & OBSERVATIONS

The age of patients recruited for the study ranged from a minimum of 16 years to a maximum of 65 years with the mean being 40.67 years (Table 1). Almost a third of them were in their 4th decade of life; and close to three-fourth in the age group 31-60 years. Females (n=24; 60%) outnumbered males (n=16; 40%) by a ratio of 3:2.

Table 1 Age distribution of patients

Age group (in years)	Number (N)	Percentage (%)
0-10	0	0
11-20	5	12.5
21-30	4	10
31-40	12	30
41-50	9	22.5
51-60	8	20
61-70	2	5
71-80	0	0
Total	**40**	**100**

The overwhelming majority (n=29; 72.5%) of patients had pemphigus vulgaris while there were 10 (25%) cases of pemphigus foliaceus and a solitary case (2.5%) of pemphigus vegetans. Oral lesions were present in as many as 23 (57.5%) of the patients. The average duration of disease at presentation was 7.01 months, with a maximum duration of 60 months and minimum of 0.1 months. The average duration of Phase I of DCP was 6.72 months, with a maximum duration of 20 months and a minimum of 3 months.

Age **(Figure 1)** and gender **(Figure 2)** of the patient were not found to have appreciable effect on duration of phase I of DCP; p value of 0.225 and 0.666 respectively (p value > 0.05). Patients with pemphigus foliaceus (PF) took slightly longer than those with pemphigus vulgaris (PV) to clear phase I but the difference was statistically insignificant; p value > 0.05 **(Figure 3)**. Oral lesions are known to be recalcitrant to treatment. However, in the present study, no significant difference was found in the duration of phase I between patients with oral lesions and those without; p value > 0.05 **(Figure 4)**. On the other hand, disease severity was found to significantly influence the duration of phase I; p value 0.00 **(Figure 5)**.

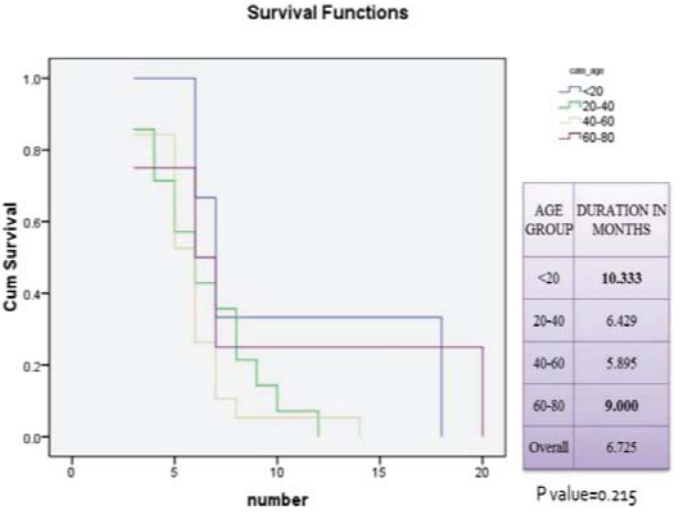
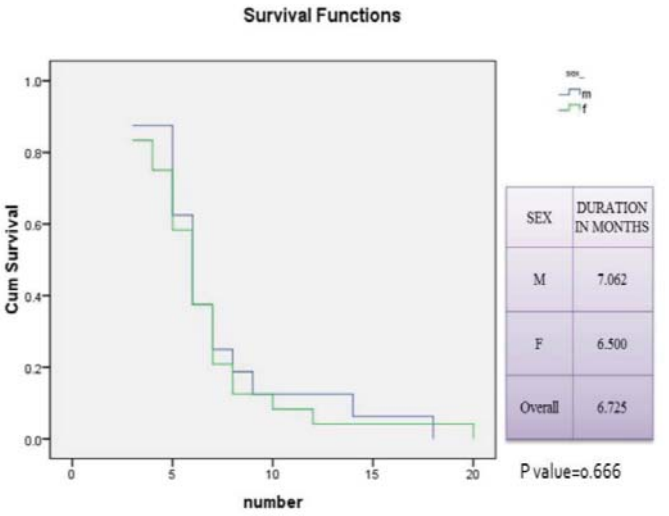
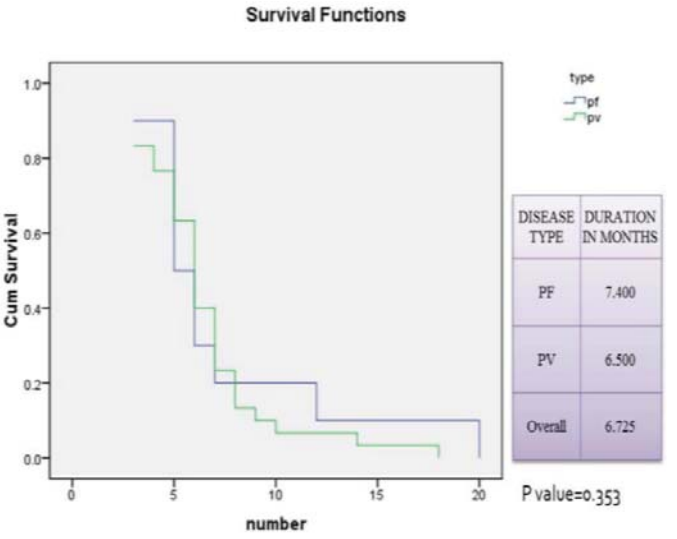


Figure 1 Relation between age and duration of phase I



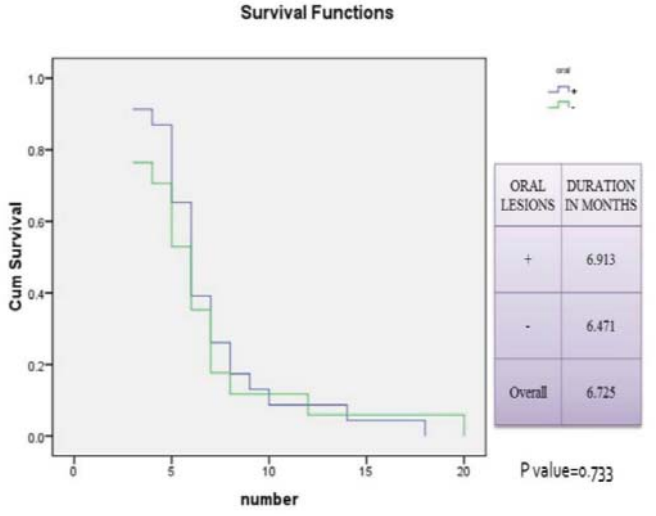
SEX	DURATION IN MONTHS
M	7.062
F	6.500
Overall	6.725

Figure 2 Relation between sex and duration of phase I



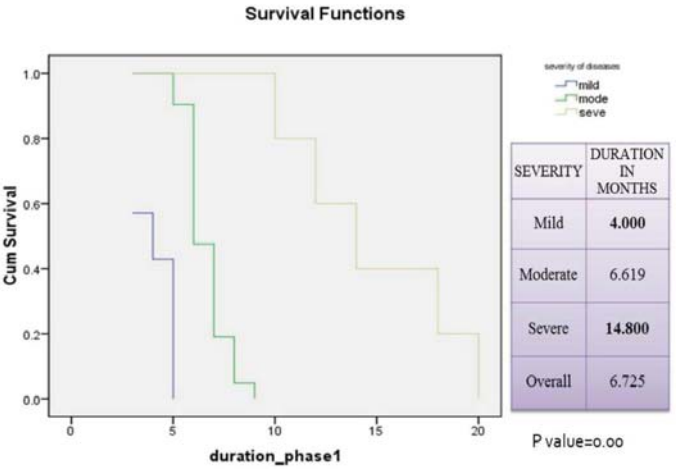
DISEASE TYPE	DURATION IN MONTHS
PF	7.400
PV	6.500
Overall	6.725

Figure 3 Relation between disease type and duration of phase I



ORAL LESIONS	DURATION IN MONTHS
+	6.913
-	6.471
Overall	6.725

Figure 4 Relation between oral lesion and duration of DCP phase I



SEVERITY	DURATION IN MONTHS
Mild	4.000
Moderate	6.619
Severe	14.800
Overall	6.725

Figure 5 Relation between disease severity and duration of DCP phase I

DISCUSSION

DCP is a widely used therapy in patients with pemphigus and other dermatological disorders. It is, however, surprising that there is only a single Indian study[8] that has attempted to assess the factors that affect the duration of phase I of DCP and none from our neck of the woods. This study was undertaken to fill that information lacuna.

As many as thirty six (90%) of the 40 patients enrolled in our study completed phase I of DCP with 10 or less pulses. This is comparable to a study by Pasricha *et al*[5] where 83.7% patients required up to nine pulses in phase I. Similarly, eighty four (85.7%) of the 98 patients completed phase I within 10 months in a study by Chitra *et al*.[8]

The age, gender, type of disease, or presence of oral lesions were found to have no significant effect on duration of phase I of DCP in our study. We, however, found that the severity of pemphigus correlated with the duration of phase I of DCP. This is in accordance with the findings of the study done by Chitra *et al*.[8] Kanwar *et al*.[9,10] had reported in their series that the response to pulse therapy was faster in mild disease and that severe disease entails more number of pulses as well as higher doses of interval oral corticosteroids. These results are similar to those of our study but are contrary to the observations made by Rao *et al*.,[11] who did not find the duration of phase I of DCP to correspond with the severity, extent, duration or grading of pemphigus.

CONCLUSION

The severity of pemphigus is a clinically important and statistically significant determinant of duration of phase I of DCP. The findings from a larger study with greater sample size will provide more detailed understanding of the interplay between various other patient and disease related factors responsible for affecting the duration of phase I of DCP. This will be pivotal in addressing the concerns and expectations of pemphigus patients being treated with DCP regarding probable duration and outcome of therapy.

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Pulmonary Involvement of Rheumatoid Arthritis with Special Reference to HRCT Thorax and Spirometry

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ABSTRACT

***Objective:** This study tries to evaluate the extent of pulmonary involvement of Rheumatoid Arthritis (RA) with the help of High-Resolution Computerized Tomography of Thorax and Spirometer. Thus, this study gives insight about necessity of ruling out pulmonary involvement in patients of Rheumatoid Arthritis early in the phase of treatment to cut-down both morbidity and mortality of such patients by offering them requisite treatment as early intervention. **Methods:** The study was conducted in the department of Medicine; Gauhati Medical College & Hospital over 40 cases of RA were diagnosed by the revised criteria for classification of Rheumatoid Arthritis (ACR-ULAR-2010 Criteria). The cases were thoroughly studied using a proforma to collect socio-demographic and clinical data. The clinical data collected on the ACR guidelines and laboratory parameter evaluation was also carried out. X-ray of any other joint involved, chest x-ray, ECG, High Resolution Computer Tomography (HRCT) Thorax and spirometer were collected. **Result**: More than half (n=21, 52.5%) of the sample had different abnormal lung parenchymal changes on HRCT and half of the sample had abnormal restrictive and mixed pattern in spirometer (n=20, 50%), showing very high prevalence of pulmonary involvement in patients of RA. **Conclusion:** There is definite relationship of pulmonary involvement in cases of RA, wherein HRCT proves to be more sensitive in detecting abnormalities that were clinically silent and missed on plain radiography. Good correlation between HRCT and spirometer exists and this contributes to detection of early parenchymal changes.*

***Keywords:** Reticulonodular Pattern, Parenchymal Change, Inflammatory Changes*

INTRODUCTION

Rheumatoid Arthritis is a chronic multi-system disease characterized by persistent inflammatory response usually involving peripheral joints in a symmetrical distribution with a variety of extra-articular manifestations.[1] Pulmonary involvement is one of the most frequent manifestations amongst the systemic manifestations and these may even precede the development of arthritis by number of years.

Approximately 1% of the world's total population is affected by Rheumatoid Arthritis.[2] Women are affected approximately 3 times more often than men.[2] The prevalence of Rheumatoid Arthritis increases with age and the sex difference diminishes in older age groups. The onset is most frequent during the 4th and 5th decades of life, with 80% of the patients developing the disease between the ages of 35 to 50 yrs.

Rheumatoid Arthritis in Indian population is comparable to the world scenario, although the disease onset is relatively earlier and extra-articular manifestations are seen less frequently than those of the West.[3] The disease course is somewhat benign in the Indian patients.[3]

Pulmonary involvement is frequent in Rheumatoid Arthritis and occurs in a variety of forms[4] the commonest are pleural effusion, parenchymal nodules and interstitial fibrosis. Combinations of these manifestations are frequently seen. Other pulmonary

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manifestations of Rheumatoid Arthritis include- bronchiolitis obliterans, amyloidosis and vasculitis. These extra-articular manifestations occur because of aberrant immunological response resulting in end-organ damage.[1]

Pulmonary involvement results in significantly increased morbidity and mortality wherein dysfunctions may be either a direct effect of the underlying disease process or a secondary complication due to treatment toxicities and opportunistic infections.[1]

Most clinical trials on Rheumatoid Arthritis have focused on the constitutional and articular features and symptoms and have overlooked the extra- articular manifestations like the pulmonary manifestations, which become the cause of mortality in later part of the disease.

In its description by Scott D[4], interstitial lung disease (ILD) quietly appeared as the predominant pulmonary manifestation of Rheumatoid arthritis after excluding drug-induced pulmonary disease. The appearance of pleuritic pain, shortness of breath, (either progressive or of recent onset) or hemoptysis suggests pulmonary disease in RA patients. Lung complications may include pleural disease, rheumatoid nodules, interstitial fibrosis, or Bronchiolitis Obliterans with Organizing Pneumonia (BOOP). Initial radio graphical studies found a lower incidence of 1.6-5% of ILD in Rheumatoid Arthritis. The incidence of pleuritis in RA patients is nearly 20%.[5] Diffuse interstitial fibrosis affects 10% of patients with RA.[5] Its clinical presentation is no different from the idiopathic pulmonary fibrosis, and it presents as a slowly progressing shortness of breath.[6] Coexisting subcutaneous rheumatoid nodules, high titres of circulating rheumatoid factor or antinuclear antibodies are also considered significant risk factors[7] while the incidence of ILD appears unrelated to the severity of articular disease.

HRCT is much more sensitive than plain chest radiography in the assessment of ILD and its higher sensitivity should help an earlier diagnosis. HRCT shows similar lesions, including ground glass opacification, basal honeycombing, traction bronchiectasis and emphysema.[10] HRCT was able to detect interstitial pneumonitis in Rheumatoid Arthritis patients with normal chest radiography. HRCT should, therefore, be performed in all Rheumatoid Arthritis patients presenting with either risk factors for ILD or minor changes on chest radiographs. Computed Tomography, particularly High Resolution thin section Computed Tomography(HRCT) is useful in differentiating and sensitively diagnosing interstitial processes, the detection of diseases in its early stage when radiographic changes are minimal or normal, and to determine the site and extent of the disease.[8]

Corlet B[9], found that the most common HRCT finding was bronchiectasis (30.5%) followed by pulmonary nodule (28%) and air trapping (25%). Ground Glass Opacity (90%) and Reticulation (98%) were the most common CT features.[10]

Functional impairment, as assessed by spirometry concluded significant correlation with HRCT findings.[11] Similarly Cortet B[9], found that there is significant association between small airway involvement on PFT and bronchiectasis on HRCT in unselected Rheumatoid Arthritis patients. The forced expiratory flow rate between 25% and 75% of the vital capacity (FEF 25-75%) was more reduced in patients with interlobular septal thickenings than in patients without these thickenings. The patients with mosaic attenuation had significantly lower mean values of FEF (25-75%) and a lower peak expiratory flow than patients without mosaic attenuation. It is widely known that a relatively higher percentage of mosaic attenuation with air-trapping and a good correlation between these and functional values contribute to the detection of early airway obstruction with Rheumatoid Arthritis, and even in patients with infiltrative lung disease only.[12]

MATERIALS AND METHODS

The study was conducted in the department of Medicine; Gauhati Medical College & Hospital. A total of 40 cases of RA were diagnosed by the revised criteria for classification of Rheumatoid Arthritis (ACR-ULAR2010) Critera.[13] The cases were thoroughly studied using a proforma to collect socio-demographic and clinical data. The Clinical data collected on the ACR guidelines and laboratory parameter evaluation was also carried out. X-ray of any other joint involved, chest x-ray, ECG, HRCT Thorax and spirometry were collected including routine blood parameters Rheumatoid Factor, ANA, S. Uric Acid, ASO Titre and C - reactive protein. Reports of informed consent were taken from each patient to include in the study. Ethical clearance was obtained from the institutional ethical committee of GMCH.

Objectives: To assess the incidence of lung involvement in Rheumatoid Arthritis in relation to CT Thorax and Spirometry findings.

RESULTS

The clinical presentations of the disease as well as incidence of pulmonary manifestations were observed and analyzed in 26(65%) females and 14 male (35%). The male to female ratio was 7:13. The house-wives formed the majority group and the lower-income group had the highest incidence of Rheumatoid Arthritis (37.5%). Only 5% of the cases have first degree relatives being affected. Presenting symptoms were analyzed and the most common symptom was found to be polyarthritis (95%) followed by morning stiffness (62.5%) and difficulty in doing house-hold jobs (25%).The most common constitutional symptom is morning stiffness. The maximum number of cases had duration between 6 months to 1 year (37.5%). Majority of patients had insidious onset of illness (97.5%). Metatarsophalangeal joints were found to be affected highest in our sample (100%) followed by proximal inter-phalangeal (PIP) joints (92.5%) and wrist joints (85%). More than one joint were involved in the same patient. 17.5% of the sample had pulmonary involvement in the form of cough followed by 10% with respiratory difficulty, but 72.5% of patients did not have any pulmonary involvement. The radiological joint changes were graded and maximum number of patients had grade I (Peri-articular osteoporosis) radiological progression(50%) followed by grade III (Erosion) in 27.5% patients. 22.5% of the patients did not have any changes. PA View of chest was done to see presence of any cardio-pulmonary changes. Following **tables** shows the various findings of this study.

Table 1 Findings of chest x-rays

Chest X-RAY	No. of cases	Percentage
Normal	30	30
Non-specific increased broncho-pulmonary vascular markings	2	2
Cardiomegaly	1	1
Non-homogeneous opacity	1	1
Bronchiectasis	2	2
Pleural effusion	3	3
Pneumonitis with consolidation	2	2

The patients underwent High-Resolution thin sliced Computed Tomography of thorax and most of the CT was normal as shown in **Table 2**. HRCT Scan of thorax was normal in most of the patients (47.5%).

Table 2 Findings on HRCT Thorax

CT Scan(HRCT)	No of cases	Percentage
Normal	19	47.5%
Reticulonodular pattern	4	10%
Interstitial pneumonia	2	5%
Fibrosis including interlobular thickening	3	7.5%
Bronchiectasis	7	17.5%
Pleural effusion	3	7.5%
Pleural thickening	2	5%

All 40 patients included in the study under-went spirometry and data were obtained from a forced expiratory maneuver and these were used to generate (volume vs. time) curve, (flow vs. volume) of curves. Both types of curves gave the same information; the flow volume type of curve is helpful in detecting inadequate patient's effort. Assessment done was broadly classified into restrictive, obstructive and mixed pattern. **Table 3** shows the various patterns of findings.

Table 3 Findings on Spirometry

Spirometry	No. of cases	Percentage
Normal	20	50%
Restrictive	19	47.5%
i)Mild	10	25%
ii) Moderate	5	12.5%
iii) Moderate-severe	2	5%
iv) Severe	2	5%
Mixed pattern	1	2.5%

DISCUSSION

Rheumatoid Arthritis is a common disorder; affecting people of all ethnic group worldwide. Prevalence in general population is 0.5%-1%[14] although Rheumatoid Arthritis can occur at any age, the incidence increases with advancing age. The peak incidence of RA occurs during 4th to 5th decade of life. Ankoor Shah[14] found it to have increases between 25 to 55 years of age and plateaus at 75 and then decreases which has the similarity with our study. Females are affected more commonly than males in the ratio of 2-3:1[14] similar to our study (1.8:1).

Most of our patients had an insidious onset (97.5%) reflecting the usual onset of the illness and the most common presenting symptom was polyarthritis, MCP joints being the most commonly affected (100%), followed by PIP joints in 37 cases (92.5) and the wrist joint in 34 cases (85%). Akhil M[15] found wrist joints to be most commonly affected, as are the PIP and MCP joints. Morning stiffness was the commonest complaint in 62.5% with other constitutional symptoms in 22.5% cases.

Thoracic involvement often develops in patients as their disease progresses. Pleural disease is the most common thoracic manifestation and is seen much more frequently in men.[14] Pleural effusions is the most common respiratory manifestation and are usually unilateral and may be loculated. They usually occur late in the disease and are commonly associated with pericarditis and subcutaneous nodules. Habib HM[16] described pulmonary involvement with pericardial effusion (21%), pleural effusion (9%) and pulmonary fibrosis (6%). In our study (7.5%) presented with pleural effusion which was unilateral, bilateral and encysted effusion respectively supportive of study done by Koshy S[17] (3.6%). Pleural thickening is the next most common finding and is seen more often than pleural effusion.

HRCT done in all the 40 cases revealed all the finding described by various authors mentioned in the various studies. A spirometric finding of RA patients has shown in **Table 3**. Kelly CA[18] described restrictive changes in PFT studies. Terasaki H[11] described significant functional impairment in spirometric parameters mainly the FEF 25-75. Raghu G[19] was of opinion that restrictive impairment of respiratory function was the general finding in definite rheumatoid arthritis patients. Geddes DM[20] studying airway obstruction in rheumatoid arthritis patients opined that the prevalence is high and suggested that airway diseases may be the commonest form of lung involvement. Gabbay E[21], found normal spirometric values in 2/3rd of 100 patients (»33%) reduced lung capacity in 3% - 6%; finally came to the conclusion whether significant restriction of ventilation is present in chronic poly arthritis.

Linstow M[22] states that pulmonary function is unrelated to patient's age, duration, disease activity and in fact improves in course of time, despite a slight decrease in vital capacity and continued articular activity. Koshy S[17] showed a restrictive pattern in 20.8%, obstructive pattern in 7% and mixed pattern in 5.5% persons.

Saracoglu M[23] described HRCT appearances as the most appropriate tool for detection and follow-up of ILD associated with Rheumatoid Arthritis. The spirometry co-relate only partially

with grading of HRCT, however they contribute valuable information about dynamic lung function and differential diagnosis.

The serological marker Rheumatoid Factor (RF) plays a significant role in disease pathology and its outcome, though not specific for Rheumatoid Arthritis. In present study, RF positive (90%) and titre in the range of 40iu/ml were highest and replicated with findings of study by Margo CM[24] and Habib H M.[16] Anaemia as a common hematological disturbance was replicated by Ankoor[14] in this study too.

CONCLUSION

The study reveals that pulmonary involvement is a common finding in Rheumatoid Arthritis. HRCT is the most appropriate tool for detection and follow-up of ILD associated with Rheumatoid Arthritis. There is significant association between small airway involvement on PFT and bronchiectasis on HRCT amongst the Rheumatoid Arthritis patients. The spirometry co-relates with HRCT findings and will contribute valuable information about dynamic lung function. Good correlation between HRCT and spirometer exists and this contributes to detection of early parenchymal changes in the lung.

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ORIGINAL PAPER

Socio-demographic and Clinical Profile of Substance use Disorders Admitted in a Tertiary Hospital in Manipur

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ABSTRACT

Background: *Substance abuse is a widely prevalent and growing problem of the present day, especially in the state of Manipur. In this study we are trying to find out the clinical profile of substance users admitted patients in the De-addiction centre of Department of Psychiatry, RIMS.* ***Methods:*** *In this retrospective study, 700 samples were examined from the register of the in-patients, Department of Psychiatry, RIMS. All patients diagnosed with any kinds of substance abuse and admitted in the de-addiction centre of Department of Psychiatry from 9/ 2011 to 8/2015 were included in the study.* ***Results:*** *Majority of them are males 99.4% (n-696). 81.3% (n-569)are alcohol withdrawal out of which 62.9% (n-440) are uncomplicated withdrawal and 19.4% (n-136) are complicated withdrawal. 11.9% (n-83) are opioid users, 2.1%(n-15) are cannabis induced psychosis, 4.3% (n-30) are polysubstance use disorders. There are no deaths as such reported. Most common age group found with highest frequency of substance abuse was found to be within (31-40) years which is 35.6% (n-249).88.4% (n-619) are Hindus, 9.9% (n-69) are Christians, 1.7% (n-12) are Muslims.* ***Conclusion:*** *From this study we conclude that the most common cases admitted patients are among the alcohol withdrawal patients, however opioid and cannabis also are playing a role into the admission of patients into hospitals.*

Keywords: *Clinical profile, Substance abuse, admitted, Tertiary hospital*

INTRODUCTION

While there is great concern on the illicit effects of substance abuse and the increase rate of admission of patients with substance abuse in the Department of Psychiatry, RIMS, there has never been any effort to study the profile of substance use disorders admitted patients in Psychiatry Department RIMS. In the recent decades we have seen significant changes in the culture and pattern of substance abuse of various types in Manipur, especially due to easily availability of substance especially alcohol, SP tablet, heroin, cannabis, nitrazepam. Increase rate of substance abuse has led to increase morbidity manifested in the form of alcohol withdrawal symptoms which can be complicated or un-complicated, opioid withdrawal symptoms, cannabis induced psychosis and premature death due to overdose and accidents.

Alcoholism is not a crime or moral weakness but an illness and a disorder. Problems arose when drinking interferes with family life, job performance, career, budget or personal health and has become a social nuisance.[1] The need for hospitalization arise when withdrawal fits or rum-fit appear on reducing the usual amount or giving up alcohol.

Opioids have been used for analgesic and other medicinal purposes for thousands of years, but they also have a long history of misuse for their psychoactive effects. Continued opioid misuse can results in syndrome of abuse and dependence and cause disturbances in mood, behaviour and cognition that can

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mimic other psychiatric disorders.[2] In Manipur the most common opioid associated with abuse and dependence in injectable form is heroin, however abuse and dependence of SP tablet is also growing popular and has been abuse in the oral form. The problems arise when clients do not have money to get the drug and reduce the dose or does not take the drug at all they get withdrawal symptoms which warrant treatment or admission to a hospital. Some do come to the hospital for detoxification and wanting help to abstain from the drug.

Cannabis preparation are obtain from the plant *Cannabis sativa* which has been used in China, India and the middle east for approximately 800 years & Delta-9-tetrahydro-cannabinol is the cannabinoid that is primarily responsible for the psychoactive effects of cannabis. Florid psychosis is common in countries in which some persons have long term access to cannabis of particularly high potency.[2] Patients with cannabis induced disorder admitted in our ward are usually suffering from cannabis induced psychosis.

Although any combination of three drugs can be used, studies have shown that alcohol is commonly used with another substance.[3] This is supported by one study where three substances were cocaine, alcohol, and heroin, which implies that those three are very popular.[4] Other studies have found that opiates, cannabis, amphetamines, hallucinogens, inhalants and benzodiazepines are often used in combination as well.[5]

AIMS AND OBJECTIVES

(1) To study the socio-demographic profile of the substance users among there admitted in de-addiction centre of Department of Psychiatry RIMS and (2) To find the prevalence of substance abuse among them

MATERIALS AND METHODS

This is a retrospective study, where in-patient department register of the Department of Psychiatry, RIMS Imphal was examined and all cases diagnosed as substance abuse of any type was included in the study. Patients admitted with any kind substance use disorders from September 2011 to may 2015 were included in the study. There was no restriction in terms of age during selection. Both male and female registers were examined.

RESULTS AND ANALYSIS

The data was analyzed using SPSS 21. A total sample of 700 was entered in SPSS 21 and processed. Out of the 700 patients with substance abuse there was no death. Unfortunately, almost all patients are male. **Table 1** give an overall picture of what we are trying to look at in this study.

District wise distribution of the admitted patients with substance abuse. Majority of the patients admitted in our hospital are from Imphal West. 55.0% are from Imphal West, 14.3% from Imphal East, 14.3% from Thoubal, 4.4% from Bishnupur, 3.0% from Senapati, 2.7% from Chandel, 2.7% from Tamenglong, 2.4% from Churachandpur, 1.1% from Ukhrul.

Majority of the patients admitted in the Department of Psychiatry fall in the age group of (31-40) years. 1.1% are among the adolescents and 0.7% are among the age group of (71-80) years. Almost all patients admitted in the Department of Psychiatry were males (99.4%). There were 4 females (0.6%). Majority of the admitted patients with substance abuse were among the Hindus (88.4%), next are the Christians (9.9%), and Muslims (1.7%)

Table 1 shows that the substance most commonly abused in alcohol as most of the admitted patients are diagnosed with alcohol withdrawal i.e (81.3%), Opioid dependent syndrome (11.9%), Cannabis induced psychosis 3.4% and polysubstance abuse 3.9%.

Table 1 Patterns of substance use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Alcohol Withdrawal	569	81.3	81.3	81.3
	Opiod dependence syndrome	83	11.9	11.9	93.1
	Cannabis induced psychosis	15	2.1	2.1	95.3
	Polysubstance Abuse	30	4.3	4.3	99.6
	Others	3	.4	.4	100.0
	Total	**700**	**100.0**	**100.0**	

Table 2 shows the frequency of co-morbidity associated with substance abuse. Most of the patients didn't have any significant co-morbidity. Though, most common co-morbidity among the rest was found to be HIV (1.0%) followed by Hepatitis C (0.6%) and lastly Hepatitis B (0.1%)

Table 2 comorbidity associated with substance use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nil	688	98.3	98.3	98.3
	HIV	7	1.0	1.0	99.3
	Hepatitis C	4	.6	.6	99.9
	Hepatitis B	1	.1	.1	100.0
	Total	**700**	**100.0**	**100.0**	

Table 3 shows the frequency of types of alcohol withdrawal. Of all the patients with Alcohol dependent syndrome, majority was found to have uncomplicated withdrawal (76.4%) and rest were with complicated withdrawal (23.6%).

Table 3 Types of alcohol withdrawal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Uncomplicated withdrawal	440	62.9	76.4	76.4
	Complicated withdrawal	136	19.4	23.6	100.0
	Total	576	82.3	100.0	
Missing	System	124	17.7		
Total		**700**	**100.0**		

Table 4 shows the pattern of opioids used among the patients with opioid dependent syndrome. Most common opioid used among those patients was Heroin (64.6%) followed by SP tablets (34.4%) and lastly codeine (1.0%).

Table 4 Types of opioids used

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Heroin	62	8.9	64.6	64.6
	SP tablet	33	4.7	34.4	99.0
	Codiene	1	.1	1.0	100.0
	Total	96	13.7	100.0	
Missing	System	604	86.3		
Total		**700**	**100.0**		

Table 4 depicts the frequency of the primary drug used in case of patients with polusubstance abuse. Heroin was found to be the commonest primary drug used by the polysubstance users (37.9%) followed by Alcohol (31.0%). Next was SP tablets with a frequency of 27.6% followed by cannabis (3.4%).

Table 4 Primary drug in polytsubstance abuse

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Alcohol	9	1.3	31.0	31.0
	Heroin	11	1.6	37.9	69.0
	SP tablet	8	1.1	27.6	96.6
	Cannabis	1	.1	3.4	100.0
	Total	29	4.1	100.0	
Missing	System	671	95.9		
Total		**700**	**100.0**		

DISCUSSIONS

The maximum of the patients admitted in RIMS psychiatry ward with substance abuse are from Imphal West i.e 55.0% most probably because of the awareness of the people about the existence of RIMS psychiatry de-addiction centre, so there is instant referral from the public as well as from the neighbouring CHC and PHC. From Imphal East 14.3%, the localities falling under this district is near to this institute so people directly bring their family members with substance abuse to this institute. 14.3% from Thoubal district as against Mohan et al[8] which found 36.8% of men in Thoubal having alcohol related problem,the number of admission from this district is lower as compared to Impal West and East because this district is farther from this institute as compared to the other two districts, and some psychiatrist are employed in Thoubal district hospital so there is less referral from their end. From Bishnupur 4.4%,Senapati 3.0%, Ukhrul 1.1%,Churachandpur 2.4%,Chandel 2.7% and Tamenglong 2.7%,the admission from these 06 districts are very few because these districts are very far from RIMS psychiatry department, Imphal, and most of the general physician are trained on substance abuse and its management, so these general physician treat the patients at their end, so there is less referral.

Gupta VK et al found in their study the maximum of the admitted substance users are in the age group of 21-30 years. But in this study, we found that the majority of the patients were in the age group of 31-40 years.[6] Similar findings were reported by Mohan et al[7] who found that 59% belonged to (20-30) years group and 25% belonged to (30-40) years age group. Kumar V et al also found that majority of patients were of the age group between (26-35) years(34.16%)[8] which is nearly consistent with our study. Kadri et al also found that majority of patients were of the age group between 26-35 years (46%).[9] Singh et al found that 59.03% of drug abusers were more than 30 years of age followed by 19.86% in 26-30 years.[10] DeSilva & Fonseka found that mean age of the drug addicts was 34.04±7.5 years which is similar to mean age of 31.22±9.50 years of present study.[11]

Kumar Vinay et al reported in his study that out of 521 patients, 03 are females. This study is consistent with our study where we found 04 females admitted due to substance abuse.[8]

Kumar Vinay et al reported in his study that out of 521 patients, the most common addiction was alcohol (33.78%).[8] Ndetei DM et al in his study found that the most common substance of abuse was alcohol (25.5%).[12] These two studies are consistent with our study, though our finding is higher than those two studies (81.3%). Out of all the alcohol withdrawal 76.4% are having uncomplicated withdrawal and 23.6 % are having complicated withdrawal Kumar Vinay et al reported in his study that out of 521 patients, the proportion of patients using opioids was 10.74%[10], which is almost consistent with our study 11.9%. Such a big percentage clearly depicts the rate of drugs infiltration from Myanmar and allied areas to Manipur.

Out of the patients diagnosed with opioid dependence syndrome 64.6% (n-62) are dependent on heroin, and all of them are using heroin by injection route, as against Bureau of substance abuse services which reported 83.3% (39,783) reported injection drug use (past year) in India.[13] 34.4% (n-33) are dependent on SP tablet. Admission is higher among those patients dependent on heroin because they suffer from a number of complications like abscess in the injected areas, HIV, hepatitis-B, hepatitis-C, pulmonary TB.

In our study 4.3% (n-30)are diagnosed as poly-substance

dependence syndrome. Kumar Vinay et al reported in his study that out of 521 patients, the proportion of patients using opioids was 11.32%.[7] This can be due to majority of the patients were alcohol dependent or prevalence of single drug users being more, so prevalence of polysubstance use might be less in our study. Heroin was the most common (primary) drug used in polysubstance users 37.9% (n-11). More number of people use opioid i.e heroin as primary drug because according to some patients it satisfy their craving, but the finding is too small which indicate more study is required in this field where we can examine more samples.

2.1% (n-15) are diagnosed with cannabis induced psychosis in our study. Kumar Vinay et al reported in his study that out of 521 patients, the proportion of patients using opioids was 3.26%[8] and also Gupta VK et al in their study found 2.5% of the drug abusers took cannabis as single drug.[6] Data of both the above studies are almost consistent with our study.

LIMITATIONS

First: Since this is a retrospective study, data were collected from register entered by nurse, they did not enter the co-morbidity for all the patients properly, so co-morbidity reported in this study were inadequate.

Second: The data is collected only from register so death could not be detected. If the study was conducted in the community, surely some deaths could have been detected.

Third: There are very less female in this study because they are not coming for admission otherwise in the community there must have been more females having alcoholic or other substance abuse problems.

CONCLUSIONS

From this study we conclude that the most common admitted patients are among the alcohol withdrawal patients, however opioid and cannabis also are playing a role into the admission of patients into hospitals. There is no death, and maximum among the Hindus. There is increase need to create awareness among people about ill-effects of alcohol and other substance, and a need to provide MET and relapse prevention counselling and an awareness of the availability of treatment centres of substance withdrawal for the purpose of early treatment of withdrawal symptoms to reduced unwanted morbidity and mortality.

Conflicts of interest: No conflict of interest is associated with this work.

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ORIGINAL PAPER

Correlations between Levels of Serum Uric Acid and Parameters of the Metabolic Syndrome

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ABSTRACT

***Introduction**: The metabolic syndrome is a growing general public health problem all around the world. Component of metabolic syndrome including diabetes, hypertension, dyslipidemia, and obesity are closely associated with risk factors defined for cardiovascular diseases. Serum uric acid level has been suggested to be associated with factors that contribute to the metabolic syndrome. This study was aimed at finding correlations between levels of serum uric acid and parameters of the metabolic syndrome among health care workers. **Materials and methods**: The participants (60 male, 52 female) were health care workers (doctors, sisters, paramedical staff, and 4th grade workers). Participants were evaluated with relevant history, clinical examination and laboratory investigations. **Results**: In this study, prevalence of metabolic syndrome was 28.58% (26.67% in male and 30.77% in female). Out of 112 cases 30.30% of doctors, 29.63% of nurses, 30% of paramedical staff and 25% of forth grade workers had metabolic syndrome. Prevalence of hyperuricemia in male group was 25% and in female it was 15.38% (overall 20.54%) out of which 24.24% of doctors, 11.11% of nurses, 30% of paramedical staff and 18.75% of IV-Grade workers. Waist circumference was found to be significantly associated with serum uric acid among doctors (<0.05) and nurses (<0.001). Systolic blood pressure was found to be significantly associated with serum uric acid among nurses (<0.01) and paramedical staff (<0.001). **Conclusion**: All the parameters of Metabolic Syndrome except Serum HDL were found to be significantly correlated with level of serum uric acid level as a whole among the study population.*

***Keywords:** Heath care workers, Hyperuricemia, Waist circumference*

INTRODUCTION

The metabolic syndrome is a growing public health problem all around the world. Component of metabolic syndrome including diabetes, hypertension, dyslipidemia, and obesity are closely associated with risk factors defined for cardiovascular diseases. Serum uric acid level has been suggested to be associated with factors that contribute to the metabolic syndrome. Determination of Uric acid level could be of great importance, especially in populations, such is population of Vojvodina, where 58.5 % of citizens are overweight and obese. Possible explanation for the association between higher waist circumference and hyperuricemia is generated from the evidence of independent correlation between uric acid and leptin levels, which could be a pathogenic factor responsible for uric acid level increase in obese patients. Available data indicate that the prevalence of the metabolic syndrome in Indians varies according to region, extent of urbanization, lifestyle patterns, and socioeconomic/cultural factors. Recent data showed that about one-third of the urban population in large cities in India have metabolic syndrome. Overall, the prevalence of the metabolic syndrome in migrant Indians in UK varies from 20 to 32%. The prevalence of the metabolic syndrome in migrant Indians is higher than in many other ethnic groups. Surveys in large cities in different parts of the country suggest that about one-third of the urban population in large cities in India have metabolic syndrome. Data from North India show that 66% of men and 88% of women, classified as "non obese" on the basis of the international cut-off of body mass index (BMI), cardiovascular risk factors. The term "**metabolic syndrome**" was used in 1977 by **Herman Haller** who was studying the risk factors associated with atherosclerosis. The need to precisely define metabolic syndrome stems from the need to detect accurately individuals at high risk for CVD and

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type 2 diabetes mellitus. The three components of atherogenic dyslipidemia (increased low-density lipoprotein (LDL), decreased HDL-C and high blood triglyceride concentrations) are individually associated with a cardiovascular risk, while insulin resistance significantly increases the risk of developing type 2 diabetes mellitus, although approximately 25% of insulin resistant patients have normal glucose tolerance. The association between uric acid and the Metabolic Syndrome is uncontested, but the cross-sectional nature of these studies makes it difficult to ascertain if Uric acid has a causal role in Metabolic Syndrome or is a mere consequence. Sui[1] noted higher rate of incident Metabolic Syndrome with increasing Uric acid categories, reporting men in the upper third of Uric acid levels as having 60% higher odds of developing Metabolic Syndrome which supports data obtained from both Korean and Chinese populations.

Aims and objectives: (1) To observe the serum uric acid level among the study population. (2) To find of the prevalence of metabolic syndrome among the study population (3) To correlate serum uric acid level with the components of metabolic syndrome as determined according to the criteria of the **AHA/NHLBI** (Correlation of serum uric acid with waist circumference, blood pressure, fasting blood sugar, serum triglyceride, serum HDL).

Materials and methods: Place of study: Gauhati Medical College and Hospital, Guwahati (from 1st July 2015 to 30th June 2016). **Source of data:** The participants were health care workers (doctors, sisters, paramedical staff, and 4th grade workers). **Type of study:** Observational Study**. Sample size**: 112 (60male, 52female) **inclusion criteria:** Health Care Workers of GMCH, Doctors, nurses, paramedical-staff and Forth Grade workers taken randomly, who volunteered. **Exclusion criteria:** Known case of cardiovascular disease (History of coronary artery disease & myocardial infarction), Acute infectious disease, Psoriasis, recurrent attacks of gout, Progressive malignancy under chemotherapy, Persons taking drugs like diuretic and uric acid lowering agent, Known case renal insufficiency with decreased eGFR. **Clinical examination:** Height, weight, waist circumference, blood pressure were measured with standard protocols. **Weight Measurement**: Participants were weighed in kilograms using **a digital weight scale.** Weight was measured in the early morning with empty stomach.

Height Measurement: This stature measurement is collected on all subjects. Standing height is measured using a stadiometer with a fixed vertical backboard and an adjustable head piece.

Waist circumference Measurement: Waist circumference was determined using a nonstretchable tape. Took the measurement to the nearest 0.1 cm at the end of the SPs normal expiration.

Blood pressure Measurement: (i) Blood pressure was measured twice to the nearest 2 mmHg by a mercury totally closed desk-top sphygmomanometer. (ii) Preparation for measurement: Before the blood pressure measurement begins, subjects were asked to abstain from eating, drinking (anything else than water), smoking and taking drugs that affect the blood pressure one hour before measurement. (iii) Position of the arm: The measurements were made on the right arm whenever possible, with subject's arm resting on the desk so that the antecubital fossa is at the level of the heart and palm is facing up. (iv) Cuff should encircle 80 percent or more of the patient's arm circumference. 11. Mercury column should be deflated at 2 mm per second. (v) Number of measurements: Three measurements were taken one minute apart. (vi) Position: Three positions measurements were done (supine, sitting and standing). The average value of these two measuring points for systolic and diastolic blood pressure was recorded.

Investigations: Fasting lipid profile, Fasting blood sugar, Serum uric acid, Serum Creatinine. Metabolic Syndrome was defined by (AHA/NHLBI any 3 of 5 features) [1.East Asian and South Asians Men $\geq$ 90 cm Women 80 cm and Japanese Men $\geq$ 85 cm Women $\geq$ 90 cm. 2. Triglyceride $\geq$ 150 mg/dl or on drug therapy for high triglycerides. 3. HDL Men <40 mg/dl, Women <50 mg/dl or on drug therapy for low HDL. 4. Blood pressure Systolic $\geq$ 130 mmHg and/ or Diastolic $\geq$ 85 mmHg or on drug therapy for hypertension. 5. Fasting glucosee $\geq$ 100 mg/dl or on drug therapy for elevated glucose $\geq$ 100 mg/dl (includes diabetes. Hyperuricemia is defined as $\geq$7mg/dL for men and $\geq$ 6.0mg/dl for women.

Statistical analysis: Statistical analysis was done wherever applicable. Simple observations were expressed as percentage. P-values were calculated using "GRAPHPAD INSTAT" software where two variables were to be looked for any significant association. P-value was obtained either using Chi-square test or Fisher's exact test, depending upon the sample size. A p-value < 0.05 was considered to be significant statistically.

RESULTS AND OBSERVATION

Distributions of cases are shown in **Table 1**.

Table 1 Showing Distribution of Participants According to Occupation

OCCUPATION	NUMBER	PREVALENCE
DOCTOR	33	29.46%
NURSE	27	24.11%
PARAMEDICAL STAFF	20	17.86%
FOURTH GRADE WORKER	32	28.57%
TOTAL	**112**	**100%**

The prevalence of increased waist circumference was highest among nurses. Prevalence of systolic BP 130mmHg or above was highest among doctors, whereas, prevalence of diastolic BP 85 mmHg or above was highest among paramedical staff. The prevalence of fasting blood sugar (100mg/dl or above) was highest among fourth grade workers.

The prevalence of serum triglyceride (150mg/dl or above) was highest among paramedical staff; protective cholesterol HDL {<40 mg/dl(male) or <50mg/dl(female)} was lowest among nurses as shown in **Table 2.**

Table 2 Prevalence of different parameters of Metabolic Syndrome Vs. Occupation

Occupation	Waist circumference>90cm (male)>80cm(female)	Systolic BP 130mmHg or above	Diastolic BP 85mmHg or above	FBS(100mg/ dl or above)	TG(150m g/dl or above)	HDL<40 mg/dl(mal e)<50mg/dl(female)
Doctors	27.27%	63.63%	33.33%	27.27%	30.30%	63.33%
Nurses	29.63%	51.85%	29.63%	14.81%	18.52%	70.37%
Paramedical Staff	25%	60%	45%	25%	45%	45%
Grade IV	25%	53.13%	21.88%	31.25%	28.13%	50%

DISCUSSION

In this study, prevalence of metabolic syndrome was 28.58% (26.67% in male & 30.77% in female). *D. S. Prasad*[2] in their study found women (52.2 %) had significantly higher rates of metabolic syndrome compared to men (34.2 %). In contrast, *Chow*[3] found a prevalence of metabolic syndrome of 26.9% in males and 18.4% in females in southern India. 30.30% of doctors, 29.63% of nurses, 30% of paramedical staff and 25% of fourth grade workers had metabolic syndrome.

In our study, prevalence of hyperuricemia in male was 25% and in female it was 15.38% (overall 20.54%). 24.24% of doctors, 11.11% of nurses, 30% of paramedical staff and 18.75% of forth grade workers had hyperuricemia. In the study by *Bandana sachdev*[4] prevalence of hyperuricemia in male was 14.4 % and in female it was 12.8% (overall 13.5%).

Among the participants waist circumference was found to be significantly associated with serum uric acid among doctors ($p<0.05$) and nurses ($p<0.001$). *Bandana sachdev* in her cross-sectional health examination survey too found hyperuricemia to be significantly associated with waist circumference. *JiHyon Lim et al*[5] in their study also found SUA levels were significantly and positively correlated with waist circumference.

Systolic blood pressure was found to be significantly associated with serum uric acid among nurses ($p<0.01$) and paramedical staff ($p<0.001$). *Dana Stefana Popescu et al*[6] in their study found SUA levels were significantly and positively correlated with systolic blood pressure. Diastolic blood pressure was found to be significantly associated with serum uric acid among doctors ($p<0.01$), nurses ($p<0.01$) and paramedical staff ($p<0.001$). *JiHyon Lim et al* found SUA levels were not significantly correlated with diastolic blood pressure. *Bandana sachdev* found hyperuricemia is significantly associated with diastolic blood pressure.

Fasting blood sugar was found to be significantly associated with serum uric acid among paramedical staff ($p<0.001$) and fourth grade workers ($p<0.001$). *Bandana sachdev* too reached similar conclusion.

Serum triglyceride level was found to be significantly associated with serum uric acid among nurses ($p<0.05$). *Yongqiang Li et al*[7] found serum uric acid levels were significantly and positively associated with serum triglyceride level. *Gladys Soans et al*[8] in their study found an increased uric acid level with increasing triglycerides. *Conen et al*[9]; *Schachter* and *Bandana sachdev* showed the same results.

Serum HDL was found to be significantly associated with serum uric acid among paramedical staff ($p<0.05$). Serum uric acid levels were significantly and negatively correlated with HDL-C in males, but not in females. *Sara Nejatinamini1 et al*[10] *in* their study, had found significant relationship of serum uric acid with low HDL level.

CONCLUSION

All the parameters of Metabolic Syndrome except Serum HDL were found to be significantly correlated with level of serum uric acid level as a whole among the study population. Among the professional subgroups, waist circumference was found to be significantly correlated with serum uric acid among doctors and nurses, systolic blood pressure was found to be significantly correlated among nurses and paramedical staff, diastolic blood pressure was found to be significantly correlated among doctors, nurses and paramedical staff, fasting blood sugar was found to be significantly correlated among paramedical staff and fourth grade workers, serum triglyceride level was found to be significantly correlated among nurses and serum HDL level was found to be significantly correlated with serum uric acid among paramedical staff and fourth grade workers. At multicentre, large number of subjects to be followed up for a long duration to get conclusive results.

Conflict of interest: None declared.

Ethical clearance: Taken.

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Contribution of authors: We declare that the authors named in this article did this work and all liabilities pertaining to claims relating to the content of this article will be borned by the authors. We declare that this work does not infringe any copyright or violate any other right of any third parties; the article has not been published 9 whole or in part) elsewhere in any form, except as provided herein. We declare that that all the authors have contributed sufficiently in the article and take public responsibility for it. All authors read and approved the final manuscript.

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A Study on the Size of Pineal Gland in Different Ages

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ABSTRACT

Introduction: *At various times in the history of medicine the precise function of the small discrete pea-like structure we have in the centre of our brains, called the pineal gland ("corpus pineale"), was considered to be a memory valve, a valve controlling circulating vital fluids, the seat of the soul, and the site of a presumed pathology causing certain types of mental illness. In the mid nineteen fifties this confusion began to clear when the pineal gland's true function was discovered. The gland is a neuroendocrine gland and consists of parenchymal cells, called pinealocytes and neuroglial cells. Melatonin, 5methoxy-N-acetyltryptamin, is a neurohormone of the brain produced by pineal gland. The modern systematic study of the pineal gland began in 1954. There are very few literatures where the size of the pineal gland has been described.* ***Material and Methods****: In the present study 50 numbers of MRI cases done for various purposes, where no pathology of brain was detected were taken in the Radiology department of Gauhati Medical College after obtaining due consent. The length (Antero-posterior diameter) and breadth (Cranio-caudaldiameter) of the pineal gland was recorded. The data recorded was analysed statistically using Student's T-test. P value d" 0.05 is considered as statistically significant.* ***Result:*** *The maximum mean length of pineal gland was observed asbe 5.715±0.651 mm in the age group of '20 to below 40' years. D**iscussion:** The findings of our study has the similar [ty with the observations made by other researchers f this field.* ***Conclusion****: Such a study may be useful in establishing a database which may be useful in correlating the size of the gland with various brain pathology.*

Keywords*: Neuroendocrine gland, Antero-posterior diameter, Cranio-caudal diameter*

INTRODUCTION

The pineal gland or epiphysis cerebri is a small grey organ occupying a depression between the superior colliculi. It is inferior to the splenium of corpus callosum, from which it is separated by the tela choroidea of third ventricle and contained cerebral vein.[1] The pineal gland is innervated by a nerve called nervus conarii which consists of postganglionic sympathetic fibers arising from superior cervical ganglion.[2] Melatonin,5methoxy-N-acetyltryptamin, is a neurohormone of the brain produced by pineal gland. Within the pineal gland, serotonin is acetylated to yield melatonin.[3] The main environmental control of the pineal melatonin synthesis is light intensity. Light perceived by the retina reaches the supra chiasmatic nucleus (SCN) through the retinohypothalamic tract. The SCN innervates the pineal gland via the dorsomedial hypothalamic nucleus, the upper thoracic intermediolateral cell columns of the spinal cord and the superior cervical ganglia, resulting in the rhythmic secretion of melatonin.[4]In humans, as in animals, the plasma melatonin level rises in darkness and falls during the day.[5]In humans, the pineal gland is 5 mm long, 1–4 mm thick and weighs about 100 mg, both in men and in women.[6] The size of the pineal gland is significantly smaller in patients younger than 2 years old than in older patients. The size of the pineal gland increases until 2 years of age and remains stationary between the ages of 2 and 20 years. There is no difference in size between males and females.[7] At present it is considered to be the most highly evolved gland of the body.[8]A unique anatomical feature of pineal gland is that it is an unpaired midline organ in the brain which, alone of all equivalent organs, has resisted encroachment by the corpus callosum.[9,10] Concretions of calcified material called brain sand progressively accumulate within the

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pineal gland with age.[11]The calcium phosphates and carbonates are deposited in the gland with age in the form of multilaminar corpuscles called corpora arenacia or brain sand.[12]

OBJECTIVES

1. To measure the length (antero-posterior diameter) and breadth (cranio-caudal diameter) of the pineal gland in different ages with the help of MRI.

2. To correlate the size of the pineal gland with age.

MATERIALS AND METHODS

The study has been done at Gauhati Medical College & Hospital involving the Departments of Anatomy, and Radiology.

Selection of subjects: Two major groups, Group A (male) & Group B (female) were made for different age groups. In both the groups subjects were selected from the patients coming to the Radiology department of GMC and who did not have any major brain injury/ pathology which could disturb the size of the pineal gland.

Time and place for MRI: From 10.00 am to 4.00 pm at Radiology department of Gauhati Medical College Hospital.

Number of cases: In both male and female, we have studied the length & breath of the pineal gland, seen in sagittal section of M.R.I. for 50 (fifty) number of cases. In M.R.I. the pineal gland is best visualized in sagittal section. In some of the cases the pineal gland is not seen in M.R.I. For those cases we have put the value '0' (Zero).

Statistical analysis: The data recorded were analysed statistically using Student's T-test. P value d" 0.05 is considered as statistically significant.

OBSERVATION & RESULTS

The results and observations of the present study is tabulated and graphed as follows:

Table 1 Total number of male and female cases for different age groups

Age of subject	Number of cases	
	Male	Female
0 to 19 years	4	8
20 to 39 years	8	5
40 to 59 years	8	6
60 years & above	7	4
Total	**27**	**23**

In '0 to 19' years group length and breadth of 12 numbers of male and female subjects were seen. The length ranges from 0 to 7.3 mm with a mean value of 3.45, Standard Deviation ±2.434 and Standard Error of Mean ±0.702. The breadth ranges from 0 to 3.2 mm with a mean value of 1.80, Standard Deviation ±1.217 and Standard Error of Mean ±0.351.

In '20 to 39' years group length and breadth of 13 numbers of male and female subjects were seen. The length ranges from 0 to 8.3 mm with a mean value of 5.715, Standard Deviation ±2.350 and Standard Error of Mean ±0.651.The breadth ranges from 0 to 7.4 mm with a mean value of 3.185, Standard Deviation ±1.742 and Standard Error of Mean ±0.483.

In '40 to 59' years group length and breadth of 14 numbers of male and female subjects were seen. The length ranges from 0 to 6.9 mm with a mean value of 4.507, Standard Deviation ±1.818 and Standard Error of Mean ±0.485.The breadth ranges from 0 to 6.6 mm with a mean value of 3.321, Standard Deviation ±1.520 and Standard Error of Mean ±0.887.

In '60 years and above' group length and breadth of 11 numbers of male and female subjects were seen. The length ranges from 0 to 8.2 mm with a mean value of 4.682, Standard Deviation ±2.448 and Standard Error of Mean ±0.738. The breadth ranges from 0 to 3.3 mm with a mean value of 2.382, Standard Deviation ±0.963 and Standard Error of Mean ±0.290.

The mean values of length and breadth of these four groups are represented in **Figure 1**.

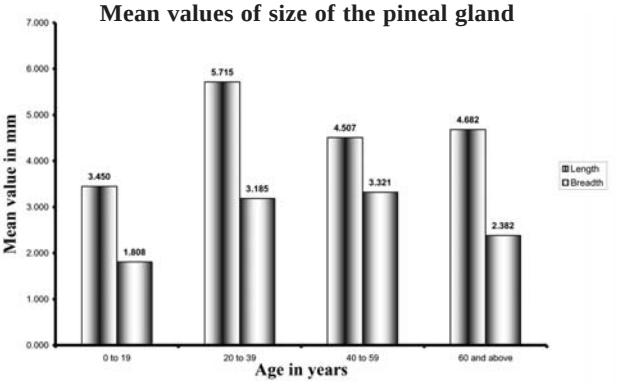

Figure 1 Mean values of length and breadth of pineal gland in different ages

Table 2 Level of significance of differences of mean value

Serial number	Comparison of mean between	"t"	P
1	Length of pineal gland in male and female	0.194	>0.05
2	Breadth of pineal gland in male and female	0.115	>0.05
3	Length of pineal gland in 20 to 39 years and 0 to 19 years	2.347	<0.05
4	Length of pineal gland in 20 to 39 years and 40 to 5 years	1.489	>0.05
5	Length of pineal gland in 20 to 39 years and 60 years & above	1.050	>0.05

Table 3 Relative frequency of length & breadth of pineal gland

Relative frequency (fr)		
Class interval in mm	**Length**	**Breadth**
0 to 2	0	0.059
2 to 4	0.128	0.702
4 to 6	0.436	0.136
6 to 8	0.326	0.103
8 to 10	0.11	0
Sum	**1**	**1**

Table 3 shows that the highest length of pineal gland is seen in the class interval of 4 to 6 mm with relative frequency of occurrence of 0.436 as evident in **figure 2**. Whereas the highest breadth of pineal gland is seen in the class interval of 2 to 4 mm with relative frequency of occurrence of 0.702 as evident in **figure 2**.

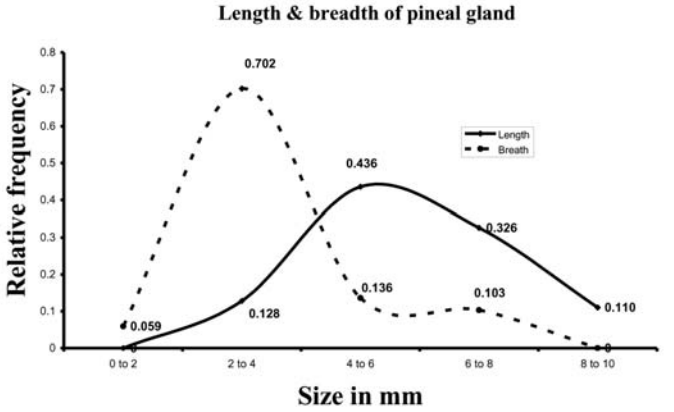

Figure 2 Distribution of 'Relative frequency' for length and breadth of pineal glands

Table 4 Relative frequency of length & breadth of male pineal glands

Male		
Class interval in mm	**Length**	**Breadth**
	Relative frequency	Relative frequency
0 to 2	0	0.048
2 to 4	0.115	0.74
4 to 6	0.415	0.123
6 to 8	0.269	0.089
8 to 10	0.201	0
Sum	**1**	**1**

Table 4 shows that the highest length of pineal gland in case of male is seen in the class interval of 4 to 6 mm with relative frequency of occurrence of 0.415 as evident in **Figure 3**. Whereas the highest breadth of pineal gland in case of male is seen in the class interval of 4 to 6 mm with relative frequency of occurrence of 0.123 as evident in **Figure 3**.

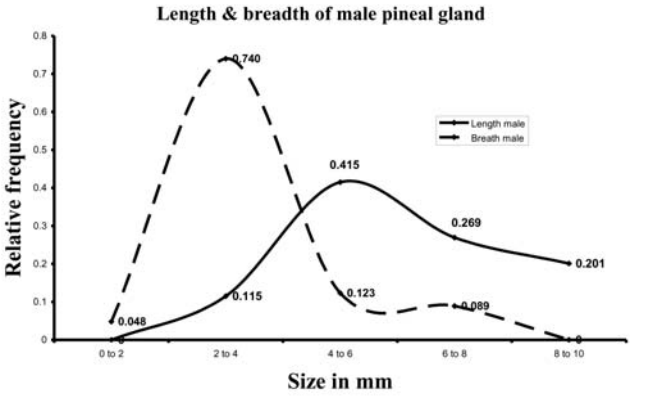

Figure 3 'Relative frequency' for length and breadth of male pineal glands

Table 5 Relative frequency of length & breadth of female pineal glands

Female		
Class interval in mm	**Length**	**Breadth**
	Relative frequency	Relative frequency
0 to 2	0	0.075
2 to 4	0.144	0.656
4 to 6	0.457	0.15
6 to 8	0.399	0.119
8 to 10	0	0
Sum	**1**	**1**

Table 5 shows that the highest length of pineal gland in case of female is seen in the class interval of 4 to 6 mm with relative frequency of occurrence of 0.457 as evident in **figure 4.** Whereas the highest breadth of pineal gland in case of female is seen in the class interval of 2 to 4 mm with relative frequency of occurrence of 0.656 as evident in **figure 4.**

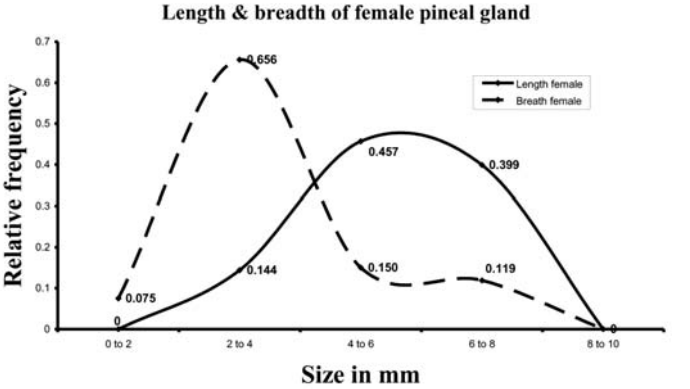

Figure 4 'Relative frequency' for length and breadth of female pineal glands

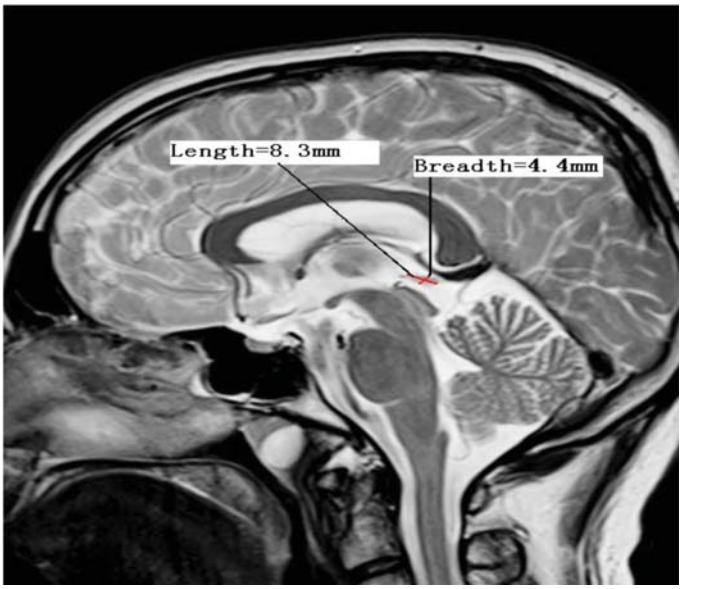

Figure 5 M.R.I. showing pineal gland of a 38 years male in sagittal section

DISCUSSION

Most of the studies have shown that the size of the pineal gland increases upto a specific period of life and there is no difference in size between males and females.[5,6,7] Our study is similar with the observation made by those researchers. The range of length of the pineal gland is from 2.1 to 9 mm and range of breadth is 1.4 mm to 7.4 mm. The distribution pattern of the pineal gland length is skewed to the right indicating presence of a group of subjects with longer pineal glands of more than 6.00 mm heaving a relative frequency of 0.436 covering the ranges from 6 mm to 10 mm depicting that about 50% of the subjects under study have pineal gland more than 6 mm in its longitudinal axis. But the distribution pattern of pineal gland breadth is normal without any apparent skewness suggesting that the distribution of pineal gland breadth is more consistent than its length.

In the present study the mean length of the pineal gland for the male subjects is found to be 4.725±0.463 mm and in the female subjects the mean length is 4.465±0.476 mm. The mean breadth of pineal gland for male and female subjects is found to be 2.740±0.272 mm and 2.686±0.341 mm respectively. No significant difference (P>0.05) is observed in both the dimensions of pineal gland between male and female subjects signifying absence of any appreciable differences in the size of the pineal gland between male and female. The presented trend of relationship between age and pineal gland length in different age groups under the current investigation clearly depicts that the size of the pineal gland (length) increases proportionately upto the age of 20 (twenty) years followed by a period of constancy in length independent of increase in age.

CONCLUSION

The maximum mean length of pineal gland is observed to be 5.715±0.651 mm in the age group of '20 to below 40' years. There is correlation between age and length of pineal gland in the age group of '20 to below 40' years followed by absence of correlation above the age of 40 years.

Finally, it may be concluded that there is no difference in size of pineal glands in male and female and the size of the pineal gland, specially the length is increased upto 40 years of age following which there is no age related dependency of pineal size studied under the limitations of the presented setup.

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Conflicts of interest: No conflict of interest is associated with this work.

Contribution of Authors: We declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

Ethical clearance: Taken from Institutional Ethical Committee.

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ORIGINAL PAPER

Immediate Unreamed Nailing Versus Delayed Nailing in Compound Tibial Shaft Fracture

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ABSTRACT

***Introduction:** Tibia is largely covered with thin soft tissue envelope, hence high chance of open fracture and exposure of bone. **Method**: We conducted a prospective, randomized control trial study on 52 patients of open grade IIIA and IIIB (Gustilo and Anderson classification) fractures regarding immediate unreamed interlocking nail in 26 patients and external fixation followed by interlocking nail (delayed nailing) in remaining half of the patients distributed as par randomisation plan and the outcome was measured. **Results**: In open Type IIIA fractures, union occurred after 18.09 and 26.5 weeks after immediate and delayed nailing group respectively while in IIIB union was achieved at 24.7week and 47.2weeks respectively. We obtained excellent results in 73.07% patients after immediate nailing and 53.84% after delayed nailing. **Conclusion:** Un-reamed solid intramedullary interlocked nailing provides excellent results in function as well as union, especially in GA Type II fracture. Immediate nailing led to earlier union in this study. Statistically significant differences were found in case of union rate and full weight bearing in favour of immediate nailing. Overall, the results were better in the immediate nailing group.*

***Keywords:** Interlocking Nailing, External Fixation, Compound Fracture*

INTRODUCTION

Evidence favours the use of interlocking nails in fixation of fractures of Tibia. Less duration of hospital stay, early mobilization and better functional outcome are the potential advantages of this technique which impart edges over others .However subcutaneous location and poor soft tissue coverage leads to frequent occurrence of open fractures and poor vascularity adds on delayed union, nonunion and infection. All these factors make the management of Tibial diaphyseal fractures not only difficult but also of particular interest to orthopaedic surgeons. Principle of management of these surgical emergencies imbibes the functional preservation with aggressive wound debridement, definitive fracture stabilization with internal or external fixation and delayed wound closure. With this background, we undertook this Randomized control trial with Grade IIIA and IIIB open fractures of the diaphysis of the tibia, who were treated with either immediate un-reamed Tibial interlocking nail (here after immediate nailing) or external fixator followed by un-reamed Tibial interlocking nail (here after delayed nailing). Sincere efforts were made to evaluate the effect of these treatment modalities in Tibial diaphyseal fractures with regards to treatment outcomes such as union time, rate and functional results as per defined outcome variables. We hope that this work would throw some light on this controversial and resource consuming problem as well as its management in our setup.

METHODS

Present study was conducted at department of Orthopaedics, Gauhati Medical College and Hospital, Guwahati from July 2012 to September 2013. 52 skeletally mature patients suffering from Tibial diaphyseal fractures were selected for the study and well informed written consent was taken. Only those patients who had valid consent, age >18 years, open grade IIIA& IIIB open Tibial diaphyseal fractures (4 cm distal to tibial tuberosity and 4 cm proximal to ankle joint), duration of injury <24 Hrs, competent neurological and vascular status of the affected limb,

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ipsilateral hip, knee, ankle and contralateral lower limb in functionally good enough so as not to exert a serious adverse effect on the rehabilitation process were included in the study. Initial care and work up of the patient was done regarding pre-operative preparation, antibiotics and anaesthesia. All patients received analgesic, Tetglob 500 I.U. and IV antibiotics. Patients were taken into operation theatre for emergency irrigation with normal saline and debridement of open fracture. Swab was taken from wound and was sent for culture and sensitivity. Fracture stabilization was done as per randomization plan either as solid intramedullary locking nail or external fixator. 13 fractures of type IIIA and13 of IIIB were fixed with immediate solid nail while, 12 and 14 no. of cases were stabilized with external fixation which later on was converted to intramedullary lock nail after wound healing. A severity of the open fractures determined the subsequent wound care and antibiotic treatment. Wounds were dealt with help of plastic surgeon. If the wound was clean and we were satisfied with our debridement primary closure was done without putting skin under tension. If the viability was of doubtful, second look after 24 hours was done. Patients were taken up for repeat debridement till satisfaction. Early closure (n= 5 and 5 in open grade IIIA, and IIIB respectively) of wound was defined when performed within 72 hours while late (n= 10, 06 each in open grade IIIA, and IIIB) in immediate nailing group. In delayed nailing group wound closure were done either primary closure, split skin graft (SSG), fasciocutaneous flap, free flap or delayed primary closure. Standard post-operative protocol was done with early mobilization in both group and follow up as per protocol. Criteria for Union at fracture site was defined as bridging callus in a minimum of three cortices on anteroposterior and lateral radiographs combined with a lack of tenderness at the fracture site or unassisted weight bearing. Delayed union was defined when the fracture did not show any signs of healing for 2 months even after dynamisation was performed along with clinical symptoms like pain and difficulty on bearing weight (Bhandari et al.[1] Nonunion was defined when 9 months had passed after the surgery and no progressive signs of union were seen for 3 consecutive months. The functional results were evaluated using the Johner and Wruh criteria. Statistical analysis was done using suitable bio-statistical technique on each variable in the same patient and between two treatment groups. Statistical screening of treatment effect was measured by relative risk reduction, absolute risk reduction with adjustment for a small sample size and confounders in the study. Paired t test and other appropriate tests were applied to check for presence of significant difference in outcome variable in two groups. The software Instat Graph pad was used in the analysis. P value less than 0.5 was considered to be significant.

RESULTS

In our study the youngest patient was of 18 years old and the oldest was 60 yrs. The mean age being 31.2 year (**Figure 1**). Most of the patients were in age group 21–30 years (40%) out of which 41 cases were male whereas 11 female.

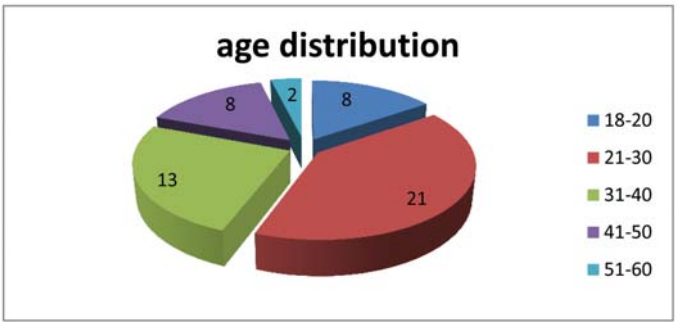

Figure 1 Pie diagram showing age distribution of patients

Road traffic accident (RTA) was the cause of injury in 29 cases (56%), followed by physical assault 11 (33%) and fall 07 (14%) as shown in **Figure 2**.

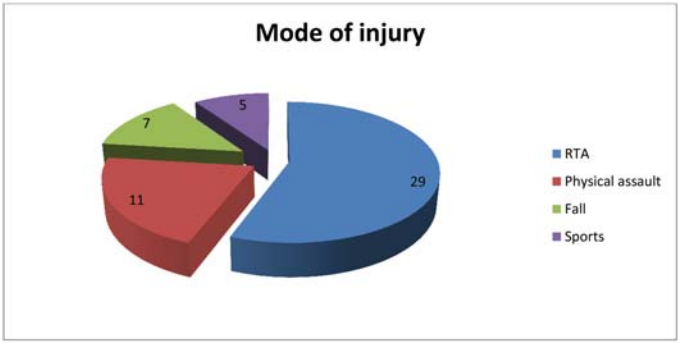

Figure 2 Pie diagram showing mode of injury

The right side affected more (n=34) than the left side (n=18). Most of the fractures were of AO type 42B3 (n= 15). The mean operative time was 65 minutes and average amount of blood loss was 130 ml. A fracture was designated as healed when there was obliteration of the fracture line in X-ray (Anderson et al 1975). All our fractures united by 28 weeks most of them by 12 weeks (n=24) followed by 16 weeks (n=14) and 20 weeks (n=11). The average time of union was 16.27 weeks in immediate nailing group. The mean duration of hospital stay was 16.4 days. Most of the patients got the range of motion between 100-134 degrees. The results were classified by Neers criteria at the end of 6 months. Functional result was excellent in 46.7 % (n =25), satisfactory in 43.3 % cases (n= 22) and unsatisfactory in 10 % (n= 5) while there were no failure cases. An Intra operative complication like difficult reduction was seen in 18 cases. 6 postoperative complications were noted as 3 superficial (**Figure 3**) and 3 deep infections.

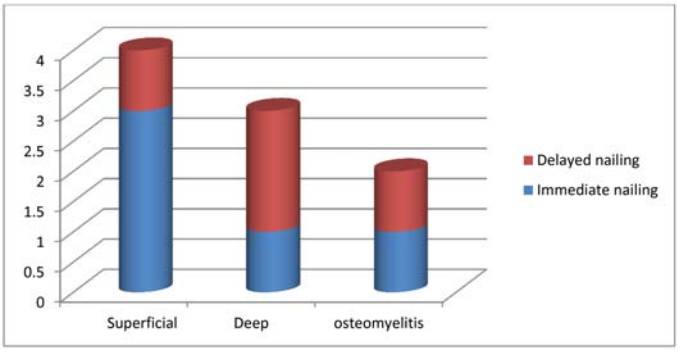

Figure 3 Bar diagram showing infection in Immediate and delayed nailing

In 2 cases the implant was removed (due to deep infection) after radiological union (28 weeks) at 5 months and 6 month interval.18 patients had mild pain on knee movement. We didn't get gross malunion to produce shortening or angular deformity.

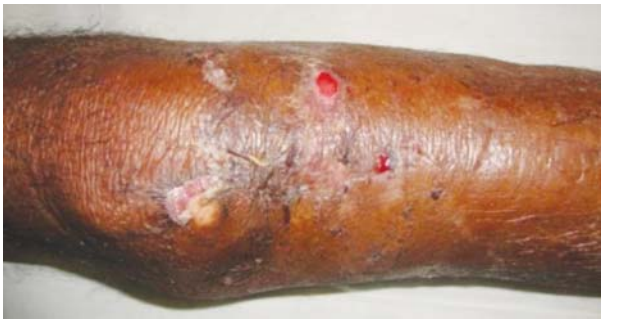

Figure 4 superficial infection

DISCUSSION

Fracture of the shaft of tibia is common injury and it continues to pose challenge for the orthopaedic surgeon. With an eventful history of both non-operative and operative treatment, the current opinion is still controversial. The results of various authors were compared with the findings of present study in **Table 1**.

Table 1 Results of various Authors

Authors	Criterion used	Procedure	Result (in %)	
Atul et al[2]	modified Ketenjian's	Primary	E-60; G-23.4; F-10P- 6.6	
Wani et al[3]	Johner and Wruh	Primary	E- 40. G- 50, F- 10	
Manas et al	modified Ketenjian's	Primary	E- 68, G- 24, F- 4, P -4	
	Johner and Wruh	Primary	E - 40, G – 50, F - 10, P - 0	
Jain et al[4]	-	Primary	E–65, G – 25, F-10	
Joshi et al[5]	modified Ketenjian's	Primary	E+G- 86, F- 11, P- 3	
Present study	Johner and Wruh	Immediate	E -73	G- 8
			F- 15	P- 4
		Delayed	E- 53	G- 38
			F- 0	P- 4

Davis performed the first immediate internal fixation following timely initial debridement of open fractures. McGraw et al[6] noted high rate of infection if nailing was done after removal of fixator. Katenzian[7], Riemer[8] and Yokoyama *et al*[9] believed there are definitive advantages of primary internal fixation provided infection could be prevented by careful and radical debridement and use of antibiotics. All immediately closed cases went for uneventful healing in immediate nailing except one with superficial infection **Figure 4** (8.33%) while 4 cases of deep infection (28.2%). This shows trend towards primary closure of compound wound. K Yokoyama et al[9] concluded that early skin closure within 1 week is the most important factor in preventing deep infections when treating open Tibial fractures. Fischer MD et al[10], Osterman PA et al[11], Gopal S et al[12], Hohmann E et al[13], Levin LS et al[14], have also documented significantly better outcomes with early closure (within 7 days). Siebenrock et al[15] reported average full weight bearing time in delayed nailing group to be 27 and 41 weeks respectively in open type II, IIIA, IIIB fractures ,which is comparable to our study. Our study showed that immediate nailing led to faster union compared to delayed nailing. Results of Reimer et al[8] union rate 7.6 months, Singer and Kellam[16] union rate 6.1 months, Schandelmaier et al[17] union rate 25.8±14 weeks, Hass et al[18] 6 months and Osterman PA et al[11] 23.5 weeks were also comparable to our study. Singh et al[19] found delayed union rate of 26.6%. In their study concluded that un-reamed interlocking with solid nail is a good mode of immediate internal fixation of compound fractures of tibia (grade I-IIIB) as it allows early weight bearing, minimizes the chances of infection and delayed union and has led to union in almost all the cases. We believe that the un-reamed smaller diameter nails failed to provide sufficient rotational stability. We agree with Blachut et al[20] that the nails inserted without reaming are usually smaller diameter nails which provide less stability. The weak link are the locking screws, that too the distal ones. Other authors have also reported similar problems in patients who were not allowed early weight-bearing.

CONCLUSION

Achievement of length, apposition, axial and rotational alignment provides excellent functional results following fractures of Tibial diaphysis. A proper pre-operative planning as well as intra-operative observance of basic surgical principles is essential for treating these fractures. A thorough knowledge of the concept features and procedure of intra-medullary interlocking nails as well as soft tissue coverage is required. Un-reamed solid intramedullary interlocked nailing provides excellent results in function as well as union, especially in GA Type II fracture. Immediate nailing led to earlier union in this study. Statistically significant differences were found in case of union rate and full weight bearing in favour of immediate nailing.

LIMITATIONS

A multi-centric randomized control trial , possibly triple blinded or at least double blinded in nature, involving a large number of patients with long term follow-up is clearly needed to bring the differences between the two techniques and making the study more significant.

Conflict of Interest: None

Source of Funding: None

Ethical Clearance: Taken

Declarations: (1) The Article is original with the author(s) and does not infringe any copyright or violate any other right of any third parties; (2) The Article has not been published (whole or in part) elsewhere, and is not being considered for publication elsewhere in any form, except as provided herein; (3) All author(s) have contributed sufficiently in the Article to take public responsibility for it and (4) All author(s) have reviewed the final version of the above manuscript and approve it for publication.

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Calibre of the Component Vessels of the "Circle of Willis" of the Human Brain

Karim Farheen Atia[1], Talukdar Kunja Lal[2], Sarma Joydeb[3]

Received on January 15, 2017; editorial approval on May 15, 2017

ABSTRACT

Introduction*: The arteries of the circle of Willis (CW) of the human brain show considerable variations of calibre and pattern. Two pair of major arteries-right and left vertebrals; right and left internal carotids deliver all their blood almost exclusively to the brain. This arterial circle equalizes the pressure of the blood flow to the two sides of the brain as it's the main collateral channel. It provides alternative routes, when one of the major arteries leading into it is blockade. There is considerable individual variation in the pattern and calibre of vessels that make up the circle of Willis.* ***Material and methods****: The calibres of the different segments of the circulus arteriosus vary so much that no two circles are completely identical. Hence a study to determine the length and external diameters of the arteries constituting the CW in the population of Assam will be of utmost importance. The length and external diameters of the arteries forming the circle of Willis were measured. The recorded data were then statistically analysed using Student's T-test. P value d" 0.05 is considered as statistically significant.* ***Result:*** *There is a statistical significant difference between diameters of both sided PCoA (t=2.123;P=0.041) and the lengths of both sided A_1(t=2.286,P=0.028).* ***Conclusion****: The data obtained in this study will help in certain medico-legal practices. The study may be helpful to neurosurgeons and neurologists in Assam in planning and executing treatment of its population.*

Keywords*: Circle of Willis, length, external diameter*

INTRODUCTION

The brain is absolutely dependant on a continuous supply of oxygenated blood.[1] Two pair of major arteries-right and left vertebrals; right and left internal carotids deliver all their blood almost exclusively to the brain.[2] The circulus arteriosus (circle of Willis) is a large arterial anastomoses that unites the internal carotid and vertebrobasilar systems. It lays in the subarachnoid space within the deep interpeduncular cistern and sorrounds the optic chiasma, the infundibulum and other structures of the interpeduncular fossa. Anteriorly, the anterior cerebral arteries, which are derived from the internal carotid arteries, are joined by the small anterior communicating artery. Posteriorly, the two posterior cerebral arteries which are formed by the division of basilar artery are joined to the ipsilateral internal carotid artery by the posterior communicating artery.[3] The calibres of the different segments of the circulus arteriosus vary so much that no two circles are completely identical.[4] This arterial circle equalizes the pressure of the blood flow to the two sides of the brain as it's the main collateral channel.[5] It provides alternative routes, when one of the major arteries leading into it is blocked.[6] There is considerable individual variation in the pattern and calibre of vessels that make up the circle of Willis. Higher percentage of abnormality of length and diameter of the vessels of the circle of Willis has been reported in the mentally ill and those with cerebrovascular catastrophe indicating possible linkage.[7] Different distributions of variations of circle of Willis may partially explain the different incidences of some cerebrovascular diseases in different ethnic or racial groups.[8]

OBJECTIVES

1. To study the length of both sides of the component arteries of circle of Willis in the population of Assam.

2. To study the diameter of both sides of the component arteries of circle of Willis in the population of Assam

MATERIALS AND METHODS

Collection of specimen: (i) From the department of Forensic Medicine, Gauhati Medical College, Guwahati, from the cadavers

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within stipulated time limit after fulfilling the formalities. Care was taken to collect the non-pathological specimens.

Method of weighing & measurement: Brains were first kept in 10% formalin and then washed with normal saline. Circle of Willis were dissected out and calibres were measured using Vernier Calipers.

Analysis: The data recorded was analysed statistically using Student's T-test. *P* value d" 0.05 is considered as statistically significant

OBSERVATION & RESULTS

The results and observations of the present study is tabulated and graphed as follows:

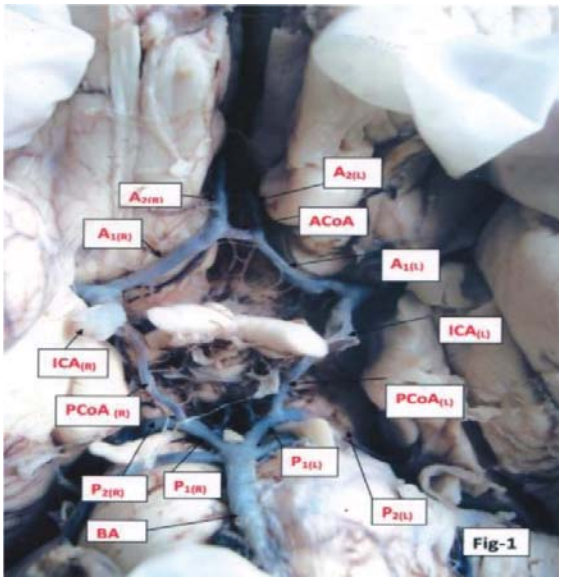

Figure 1 Circle of Willis

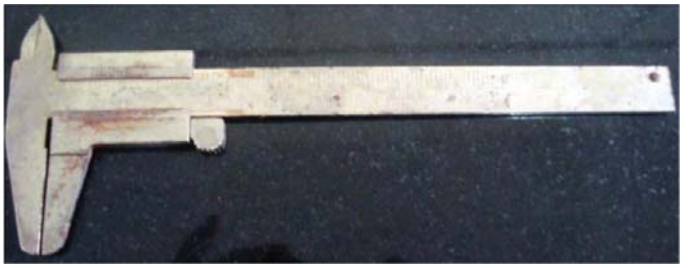

Figure 2 Vernier Calipers

Table 1 Descriptive Analysis of External Diameters (mm)of the Arteries of Circle of Willis

CW arterial segment	Mean	S.E.M	Median	SD	Minimum	Maximum
ACoA	1.56	0.12	1.40	0.68	0.40	3.10
$PCoA_{(R)}$	1.43	0.15	1.30	0.78	0.10	3.10
$PCoA_{(L)}$	1.07	0.11	1.10	0.58	0.20	2.50
$P_{1(R)}$	1.67	0.12	1.75	0.73	0.20	3.40
$P_{2(R)}$	1.63	0.12	1.60	0.61	0.20	2.90
$P_{1(L)}$	1.81	0.11	1.85	0.65	0.20	3.30
$P_{2(L)}$	1.74	0.12	1.90	0.64	0.10	3.10
$A_{1(R)}$	1.93	0.12	1.85	0.68	1.0	3.40
$A_{2(R)}$	1.85	0.11	1.75	0.62	1.0	3.80
$A_{I(L)}$	2.01	0.14	2.0	0.83	0.60	4.70
$A_{2(L)}$	1.81	0.11	1.85	0.65	0.50	3.10
$ICA_{(R)}$	3.36	3.36	3.45	0.95	1.00	5.00
$ICA_{(L)}$	3.34	3.34	3.4o	0.69	2.00	4.40

Table 2 Descriptive Analysis of Lengths(mm) of the arteries of the circle of Willis

CW arterial segment	Mean	SEM	Median	SD	Minimum	Maximum
ACoA	2.86	0.20	2.70	1.23	0.50	6.60
$PCoA_{(R)}$	10.89	0.69	10.80	3.97	2.30	19.40
$PCoA_{(L)}$	10.79	0.57	11.00	3.26	0.90	19.40
$P_{1(R)}$	5.32	0.39	4.90	2.23	1.80	12.50
$P_{1(L)}$	5.85	0.60	5.40	3.42	1.40	23.00
$A_{1(R)}$	11.75	0.64	11.30	4.04	1.00	27.40
$A_{1(L)}$	10.88	0.64	11.10	4.05	1.00	27.10

Table 3 Paired t- test of the corresponding arterial segments of the circle of Willis

S No	Measures(mm)	t value	Df	P value(two tailed)
1.	Diameter of PCoA	2.123	33	0.041
2.	Diameter of A_1	-0.325	40	0.747
3.	Diameter of A_2	0.292	38	0.772
4.	Diameter of P_1	-0.674	40	0.504
5.	Diameter of P_2	0.292	38	0.772
6.	Diameter of ICA	-0.052	40	0.959
7.	Length of PCoA	0.138	31	0.891
8.	Length of A_1	2.286	39	0.028
9.	Length of P_1	-0.677	31	0.503

The data on the diameters and lengths of the branches of arteries of the circle of Willis have been statistically determined and described in **Table 1** and **Table 2** respectively. In **Table 3** the diameters and lengths of arteries of both sides of the corresponding arterial segments of the circle of Willis have been compared through Students paired t test assuming a level of statistical significance of P value less 0.05. There is a statistical significant difference between diameters of both sided PCoA (t=2.123;P=0.041) and the lengths of both sided A_1(t=2.286,P=0.028). The average diameter of the right PCoA(1.34±0.75) was greater than of the left PCoA(1.08±0.56) and the average length of right A_1(11.75±4.04) was greater than of the left A_1(10.88±0.56).

DISCUSSION

Abnormal narrowing on the right half of the circle of Willis to be a more common occurrence. Present study showed that the length and diameter of the arteries forming the circle of Willis is variable which is similar to a Dissection Study on the length and external diameters of arteries of the CW by Kamath.[8] Similarly a Magnetic Resonance Angiography Study on the morphology of CW by Krabbe- Hartkamp[9] stated that the collateral potential of the circle of Willis is believed to be dependant on the presence and size of its component vessels, which vary among normal individuals. The blood supply of left half of the brain on the whole is less complete than to the right side according to Windle[10] and Mitterwallner.[11] The present study similarly showed statistically significant greater diameters on the right PCoA segments. However on the contrary Orlandini[12] found that the arteries to be larger on the left side of the circle of Willis. Warwick and Williams[13] found that the composite vessels of the circle of Willis in a majority of cases have a greater length and smaller diameter in the right half of the circle. In the present study only length of the right pre-communicating segment of anterior cerebral artery is significantly longer. Lacunae of the study lies in the fact that we could not find enough valid statistical evidence that

differences in calibres of the CW are similar among different populations done by other researchers or not. There should be cautious interpretations of the results of the quantative measurements of the calibres of the arterial segments as the dissection studies have not been correlated with other advanced imaging modalities like Magnetic Resonance Angiography on live subjects.

CONCLUSION

The study showed that there are individual variations in the length and external diameters of the component arterial segments of the CW. Only the diameter of right PCoA and length of the right pre-communicating segment of anterior cerebral artery segment were statistically greater than of the left half of the CW.

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Authors Contributions: We declare that this work done by the authors named in this article and all liabilities pertaining to the claims relating to the content of this article will be borne by the authors. The study was conceived and designed by Dr. Farheen A.Karim, Dr.Kunja Lal Talukdar and Dr. Joydev Sarma. The data was collected and analysed by Dr. Farheen A. Karim.

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ORIGINAL PAPER

Epidemiology of Fatal Burn injuries in a Teaching Hospital in West Bengal

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ABSTRACT

***Introduction:** Burn is a public health problem, causing an estimated 2, 65,000 deaths annually all over the world. **Aims:** The present study was conducted to study the epidemiology of fatal burn cases in a hospital based sample. **Methods:** Retrospective and cross-sectional prospective studies were used to determine all the fatal burn cases reported at the Burdwan Medical College Police Morgue. **Results**: From 2007-2009, the percentage of deaths due to fatal burn injuries was reported to be 10.78%, 12.81% and 11.91% respectively. The mean percentage of males and females is 18.84% and 81.15% respectively. Most of the victims were of the age group of 20-40 years. Rural dwellers were affected more, with the toll rising in winter months. Accidental deaths were rather common (53.61%). 24.74% was due to burn related dowry deaths. Maximum incidents of burn happened between 6.00 p.m. and 12.00 midnights. Maximum rate of mortality is within first 12 hours of sustaining injuries, with the percentage of burn being inversely proportional to the time of survival. **Conclusion:** Legislation, health promotion and appliance design have reduced the incidence of burns, with regulations regarding flame-retardant clothes and furniture, the promotion of smoke alarms, the design of cookers and gas fires, the almost universal use of cordless kettles, the education of parents and proper functioning of burn units of hospitals at all levels.*

***Keywords:** Burdwan, dowry, winter, rural*

INTRODUCTION

Injuries are an increasing recognized public health problem, affecting nearly every geographical zone of the earth.[1] Burns have always been considered as one of the most destructive injuries, causing not only mortalities, but also having major economic, psychological and somatic effects.[2,3] Burns are also among the most expensive traumatic injuries, causing long hospitalization and rehabilitation, and costly wound and scar treatment.[4,5] Thus burn is a public health problem, causing an estimated 2,65,000 deaths annually all over the world.[6]

In this backdrop, the present study has been designed to analyze the epidemiology of fatal burn cases. Worldwide, approximately 6 million patients seek medical help for burns annually and the majority are treated in the outpatient department.[7] The need for inpatient treatment solely depends upon the severity of burn, the associated injuries and the general condition of the patient.[8,9] Despite many medical advances, burns continue to remain a challenging problem due to the lack of infrastructure and trained professionals as well as the increased cost of treatment, all of which have an impact on the outcome.[10] Thus this study will explore the problems against the backdrop of our health care setup and will probably help to formulate the strategies for the prevention of unnatural deaths due to burns.

MATERIALS AND METHODS

All the fatal burn cases reported for autopsy at Police Mortuary, Burdwan Medical College, were examined from February 2010 to January 2011 and cross-sectional prospective study was carried out. Retrospective study of the fatal burn cases from 2007-2009 was also carried out. Socio-demographic profile of the victims of burn (From the history taken from the police officials and the relatives accompanying the victim),seasonal variations, manners of injuries, time of incident, percentage of burn (using Rule of Nine) and the interval between sustaining burn and death (from the inquest and the information of death) were considered as the

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parameters in the present study. Subjects with only burn injuries in fresh bodies were considered for the study and not the subjects who died due to scalds, electrocution, and lightning or radiation injuries or were found to be decomposed at the time of autopsy.

Ethical clearance was taken from the institutional ethic committee. All the data were analyzed using "SPSS for Windows".

RESULTS

Fatality due to burns: The total number of cases examined in the years 2007, 2008 and 2009 were 1938, 2021 and 2007 respectively. Among all these cases, the total number of victims due to fatal burn injuries in the years 2007, 2008 and 2009 were 209 (10.78%), 259 (12.81%) and 239 (11.91%) respectively.

Gender distribution in the years 2007- 2009 and the present study period

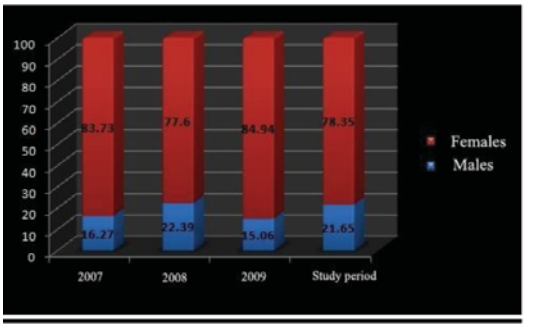

Figure 1 Gender distribution

Age distribution in the present study period

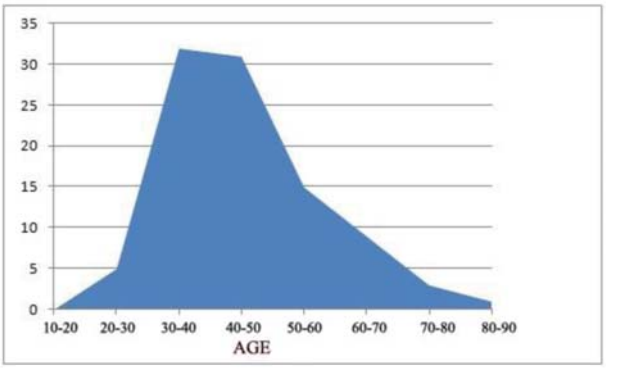

Figure 2 Age distribution

Distribution by religion in the years 2007- 2009 and the present study period: The totalpercentage of Hindus in the years 2007,2008,2009 and the present study were 80.86, 84.94, 82.84 and 80.41 respectively, whereas the total percentage of Muslims were 19.14, 15.06, 17.16 and 19.59 respectively.

Residential status (urban / rural) in the years 2007- 2009 and the present study: The total percentage of cases from rural areas in the years 2007, 2008, 2009 and the present study were 82.78, 83.39, 80.33 and 82.47 respectively, and that from the urban areas were 17.22, 16.61, 19.66 and 17.53 respectively.

Seasonal variation in the years 2007-2009 and the present study period

Table 1 Seasonal variation

Period	2007		2008		2009		Present Study	
Month	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
JAN	29	13.86	21	8.11	19	7.95	-	-
FEB	16	7.66	20	7.72	15	6.28	-	-
MAR	20	9.57	28	10.81	19	7.95	-	-
APR	15	7.18	31	11.97	17	7.11	13	13.402
MAY	21	10.05	12	4.63	26	10.88	9	9.28
JUN	20	9.57	31	11.97	22	9.205	9	9.28
JUL	13	6.22	16	6.18	23	9.62	14	14.43
AUG	5	2.39	17	6.56	15	6.28	11	11.34
SEP	12	5.74	22	8.49	17	7.11	8	8.25
OCT	12	5.74	17	6.56	20	8.37	9	9.28
NOV	23	11.004	18	6.95	17	7.11	12	12.37
DEC	23	11.004	25	9.65	29	12.13	12	12.37

The trends observed in dowry deaths in the present study period

Table 2 Dowry death trends

DOWRY DEATH TRENDS						
Total Deaths	*Percentage*	*Mean Age*	*Religion*		*Place*	
			Hindu	*Muslim*	*Rural*	*Urban*
24	*24.74%*	*24.79*	*87.5%*	*12.5%*	*83.33%*	*16.67%*

A: Accident, S: Suicide, H: Homicide

The time of incidence in the present study period

Table 3 Times of incidence

Groups	***Time Periods***	***Percentage***
A	*12.01 a.m.-6.00 a.m.*	13.40%
B	*06.01 a.m.-12.00 noon*	25.77%
C	*12.01 p.m.-6.00 p.m.*	28.87%
D	*6.01 p.m.-12.00 midnight*	31.96%

Time of survival after sustaining burn injuries: Maximum number of deaths happened to be 43.29% within first 12 hours of sustaining injuries, followed by 17.52% within 24-48 hours, 16.49% after 96 hours, 14.43% within 48-96 hours and 8.25% within 12-24 hours.

Correlation between time of survival and percentage of burn

Table 4 Correlation between time of survival and percentage of burn

	Correlation	time	percentage
Time	Pearson Correlation	1	-.352**
	Sig. (2-tailed)		.000
	N	97	97
Percentage	Pearson Correlation	-.352**	1
	Sig. (2-tailed)	.000	
	N	97	97
**. Correlation is significant at the 0.01 level (2-tailed).			

DISCUSSION

This systemic review summarizes the epidemiological characteristics of burn injuries in the district of Burdwan, West Bengal. Epidemiological studies are a prerequisite for effective burn prevention programs, because every population seems to have its own epidemiological characteristics and knowledge of epidemiology of burns is needed to select the target groups for preventive actions.

Incident rate of fatal burn injuries in our study was found to be lower than that of another study in Eastern India.[11] This may be explained by the fact that only fresh deceased of pure burn injuries was included in our study, not those who are either decomposed or dead due to scalds, electrocution, lightning or radiation injuries. The mean percentage of females was found to be significantly higher in our studyand also in another study in an Apex centre of North India.[12] Possible explanations may be the women being nervous and sensitive are more susceptible to burn injuries.[13] This may be also due to gender difference, socio-cultural factors, dowry problems and their household practices.[14]

The common age group in our study was between 20-40 years. This is in concordance with that seen in other studies.[12, 15] The high figure, with female preponderance, may be due to their household practices and long hours in the kitchen.[16]

An increased prevalence of Hindus over other religions is noted in our studyand also in another study at Vadodara City.[17] This is supported by the report of Census 2001 in the district of Burdwan.[18]

The rural population outnumbered the urban population in our studyand also in other studies across the country.[19, 20] Inadequate power supply in the rural areas leading to the use of kerosene lamps for lighting, weakly designed kerosene stoves, polyester mixed fabrics worn by the rural women, ill-designed huts and scanty medical facilities all contribute to the increased number of fatal burn injuries in the rural population.

The death due to the fatal burn injuries is more in the winter months. Findings of our study are consistent with the study by Ekrami et al, where burns were also found to be more in the winter.[21]This may be due to the use of fire for warming in the winter days.

Deaths due to dowry problems in our study is in concordance with the National Crime Records Bureau, 2010.[22] Low educational levels of women, poor implementation of existing laws, lack of establishment of voluntary associations to decrease the importance of dowries and the absence of community level projects may be the contributing factors to the rising toll of dowry deaths in India.[23]

In our study, most of the burn injuries were sustained between 06.00 p.m. to 12.00 midnight. Our results are contrary to the observations by Nabachandra et al, where most of the injuries were at daytime.[15] The increased toll at the night time may be due to ill designed lamps by spilling of kerosene, mosquito nets catching fire from the bedside lamps, unsafe cooking media and in the process of warming themselves in the cold winter months.

In the present study, maximum mortality was within 12 hours of incidence. These observations are in conformity with another study, where it isreported that maximum number of deaths were within first 12 hours of sustaining the injury.[16]

It was seen that with increased percentage of burns, the time of survival of the victims decreased. This is consistent with a study from Nigeria which shows decreased survival periods with increased burned surface areas.[24]

CONCLUSIONS

Legislation, health promotion and appliance design have reduced the incidence of burns, with regulations regarding flame-retardant clothes and furniture, the promotion of smoke alarms, the design of cookers and gas fires, the almost universal use of cordless kettles, and the education of parents to keep their hot water thermostat to sixty degree Celsius all playing their part.[25] A vast spectrum of injuries can arise from a burning accident, from the trivial to some of the most dramatic injuries that humans survive. The management of the major burn injury represents a significant challenge to every member of the burns team burns doctors, anaesthesists, ward and theatre nurses, physiotherapists, occupational therapists, dietitians, bacteriologists, physicians, psychiatrists, psychologists and the many ancillary staff whose cleaning and supply services are vital to the successful running of a burn unit. A large burn injury will have a significant effect on the patient's family and friends and the patient's future.

Conflict of Interest: No conflict of interest is associated with this work.

Ethical clearance: Taken.

Source of funding: None declared.

Declarations: (1) The Article is original with the author(s) and does not infringe any copyright or violate any other right of any third parties; (2) The Article has not been published (whole or in part) elsewhere, and is not being considered for publication elsewhere in any form, except as provided herein; (3) All author(s) have contributed sufficiently in the Article to take public

responsibility for it and (4) All author(s) have reviewed the final version of the above manuscript and approve it for publication.

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Effect of Intracuff Plain Lignocaine and Alkalinized Lignocaine for Prevention of Postoperative Sore Throat

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ABSTRACT

Background: *Emergence phenomena such as sore throat, coughing, hoarsness, etc.m are common following endotracheal tube extubation and various methods have been tried to reduce its incidence. Recently, there have been reports of using alkalinized intracuff lidocaine on ameoloration of emergence phenomenon.* ***Aims:*** *The study had been undertaken to determine the effectiveness of intracuff alkalinized lignocaine on endotracheal tube induced emergence phenomenon.* ***Methods:*** *The study was a prospective, double blinded, randomized, control one conducted in 90 adult patients of either sex, ASA I or II with Mallampati score 1, undergoing surgery under general anaesthesia with endotracheal tube, which were randomly allocated into three groups of 30 patients each to receive either intracuff air(C), plain lignocaine(PL) or alkalinized lignocaine(AL) respectively. Post-operative sore throat, hoarsness, dysphonia, haemodynamic changes, etc. were recorded for first 24 hours.* ***Results:*** *The spontaneous ventilation and extubation time were prolonged in the AL group ($P<0.001$) as compared with the other two groups. The incidence of sore throat and other throat disorders were also significantly lesser in the AL group, even though PL group is better than C group.* ***Conclusion****: Use of intracuff alkalinized lignocaine increased the endotracheal tube tolerance by reducing the incidence of emergence phenomena.*

Keywords*: Endotracheal Tube Extubation, ASA I Or II With Mallampati Score 1, Emergence Phenomena*

INTRODUCTION

Endotracheal tube (ETT) intubation is usually associated with emergence phenomena following extubation which include coughing, sore throat, dysphonia, hoarseness, hemodynamic changes, nausea and vomiting and can result in dangerous patient movement, arrhythmias, myocardial ischemia, surgical bleeding, bronchospasm and increase in intracranial and intraocular pressure.[1] These emergence phenomena are mainly due to irritation of tracheal mucosa rapidly adapting stretch receptors (RARs) by the inflated cuff, which will result in increased airway secretions and exacerbates cough.[2,3,4]

Various methods have been studied to decrease the emergence phenomena after extubation. These include use of high volume low pressure cuff endotracheal tube, use of small size endotracheal tube, "deep" extubation, administration of intravenous (i/v)opioids or intravenous lidocaine, inhalation of steroids, local lidocaine spray, and intracuff lidocaine[1]; and other pharmacological methods like beclamethasone inhalation and gargling with azulenesulfonate or ketamine.[5] The above methods could not fully control the phenomena and has got its own limitation.[1,6] Recently, there have been reports of using alkaline intracuff lidocaine on ameoloration of emergence phenomenon.

Endotracheal tube cuff are made up of polyvinyl chloride (PVC), which is hydrophobic in nature and so non ionized drug can diffuse across the cuff.[1] Commercially available lidocaine is acidic and large amount of lidocaine (200-500mg) is required for adequate control on emergence phenomena[7,8] and this could be dangerous if the cuff ruptures. Thus, addition of bicarbonates resulted in 63 fold increase in the rate and duration of diffusion of lidocaine through the endotracheal tubecuff [1,8,9,10] and prevent emergence phenomena from general anaesthesia, particularly, during surgery of long duration.[3,6,8,11]

As no such study had been undertaken in this part of the country

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to determine the effect of alkalinization of intracuff lidocaine on endotracheal tube induced emergence phenomena, the present study had been chosen.

MATERIALS AND METHODS

The study was a prospective, double blinded, randomized, control one conducted at a Tertiary care centre, Manipur from October 2014 to September 2016. After taking approval from the Institutional Ethical Committee and written informed consent from 90 adult patients of either sex, aged 18-60 yrs, ASA I or II with Mallampati score 1 and who were to undergo surgery under general anaesthesia with endotracheal tube were enrolled for the study. The enrolled patients were randomly allocated into three groups of 30 patients each using computer generated randomization method to receive 2 ml of intracuff plain lidocaine (Group PL), Group AL - 8.4% Sodium bicarbonate intracuff alkalinized lidocaine and Group C -to receive intracuff air.

A uniform anaesthetic technique was planned for all the patients. The time of extubation (time between surgical closure and dressing (T_0) and extubation), and spontaneous ventilation time (time between emergence of spontaneous breathing and extubation) were recorded. The sore throat was measured in the recovery room, at post-extubation periods of 15 minutes and 1, 3, and after 24 hours, by a blinded anaesthesiologist using a four point scale (0-3)[5] as -0= no sore throat, 1= mild,2=moderate and 3= severe sore throat.

Sample size of 30 patients for each group was determined based on the study conducted by Estebe J P et al.[8] The parameters recorded were compared between the three groups using appropriate Statistical test with Statistical Package for Social Sciences (SPSS Inc., version 21, Chicago, IL, USA) and Pd" 0.05 was deemed significant.

RESULTS AND OBSERVATIONS

All the enrolled patients completed the study protocol. The demographic parameters (**Table 1**) such as age, sex, weight distribution and duration of surgery were comparable in all the three groups and did not affect the study outcome.

Table 1 showing the demographic data of patients in the three groups

Demographic parameters	Groups			f-value & χ^2 value*	P-value
	AL (n=30)	PL (n=30)	C (n=30)		
Age (yrs) (mean ± SD)	40.33 ± 12.27	38.70 ± 12.42	40.43 ± 14.49	0.166	0.848
Sex distribution (M:F)	3:27	9:21	5:25	4.061*	0.131
Duration of Surgery (min) (mean ± SD)	71.57 ± 30.218	62.23 ± 15.60	62.73 ± 11.29	1.932	0.151
Weight (kg) (mean ± SD)	60.90 ± 7.13	58.80 ± 9.01	61.27 ± 8.96	0.751	0.475

P<0.05 is significant

The post-operative sore throat was least in the AL group and maximum in the C group, and this distribution was statistically significant (**Table 2**) at all-time points in the first 24 hours. Thus, at 24 hours 17(56.67%) and 5(16.67%) patients complained of pain in the C and PL groups respectively, whereas there was no patient with sore throat in the AL group (P<0.001).

Table 2 showing the distribution and comparison of sore throat in all the three groups

Sore throat		Groups			χ^2 value	P value
		AL (n=30)	PL (n=30)	C(n=30)		
15min	No pain	28 (93.33%)	19 (63.33%)	6 (20%)	34.35	<0.001*
	Mild pain	2 (6.67%)	11 (36.67%)	23 (76.67%)		
	Moderate pain	0	0	1 (3.33%)		
	Severe pain	0	0	0		
1 hour	No pain	28 (93.33%)	22 (73.33%)	10 (33.33%)	25.79	<0.001*
	Mild pain	2 (6.67%)	8 (26.67%)	19 (63.33%)		
	Moderate pain	0	0	1 (3.33%)		
	Severe pain	0	0	0		
3 hour	No pain	29 (96.67%)	23 (76.67%)	12 (40%)	34.12	<0.001*
	Mild pain	1 (3.33%)	7 (23.33%)	18 (60%)		
	Moderate pain	0	0	0		
	Severe pain	0	0	0		
24 hours	No pain	30 (100%)	25 (83.33%)	13 (43.33%)	27.55	<0.001*
	Mild pain	0	5 (16.67%)	17 (56.67%)		
	Moderate pain	0	0	0		
	Severe pain	0	0	0		

P<0.05 is significant

Table 3 Spontaneous ventilation time & Extubation time between the three groups *(mean ± SD)*

Variable	Groups			f-value	P value
	AL (n=30)	PL (n=30)	C (n=30)		
Spontaneous ventilation time (min)(SVT)	3.69±0.41	3.14±0.33	2.56±0.26	82.979	<0.001*
Extubation time (min) (ET)	5.03±0.88	4.28±0.47	3.46±0.32	50.883	<0.001*

P<0.05 is significant

The spontaneous ventilation time was recorded least in group C and longer in AL group (Table 3). So, the longer extubation time in group AL as compared with the other groups (P<0.001) showed that it can withstand longer time with the tube in situ during extubation.

Table 4 Endotracheal tube induced emergence phenomena between the three groups

Variable	Groups			χ^2 value	P value
	AL (n=30)	PL (n=30)	C (n=30)		
Cough (%)	1 (3.33%)	5 (16.66%)	9 (30%)	7.680	0.021
Restlessness (%)	0	1 (3.33%)	1 (3.33%)	1.023	0.600
Hoarseness (%)	5 (16.66%)	16 (53.33%)	19 (63.33%)	14.670	0.001*
Dysphonia (%)	1 (3.33%)	7 (23.33%)	11 (36.66%)	10.141	0.006*
PONV (%)	0	0	2 (6.66%)	4.091	0.129
Trouble for swallowing reflex (%)	0	0	0		
Bucking	2 (6.66%)	17 (56.66%)	19 (63.33%)	23.593	<0.001*

P<0.05 is significant

Emergence phenomena were recorded least with 5 patients of hoarsness in group AL as compared with the other two groups. Significant emergence phenomena with maximum number of cases were noted in the control group (**Table 4**).

Table 5 Distribution of haemodynamics variables in the three groups (mean ± SD)

Parameters		Groups			f-value	P value
		AL (n=30)	PL (n=30)	C (n=30)		
Heart rate (per min)	*Pre operative*	82.70 ± 6.79	81.13±8.41	80.37±7.308	0.747	0.477
	Extubation	98.97±6.41	100.27±7.50	107.53±11.20	8.611	<0.001*
MAP (mm Hg)	*Pre operative*	95.53±10.12	96.03±11.41	94.10±7.62	0.312	0.733
	Extubation	111.33±12.43	113.67±10.28	119.87±7.93	5.419	0.006*

P<0.05 is significant

The haemodynamic parameters such as heart rate and mean arterial pressure (MAP), as shown in table 5, at extubation time was maximum with C group and least in the AL group as compared with the preoperative value and this distribution was statistically significant (P<0.05).

DISCUSSION

Quality assurance of anaesthesia has become increasingly important for improving post-operative outcome.[5] Post-operative sore throat occurs in up to 90% of intubated patients and is the most common complaint after tracheal intubation.[12] During nitrous oxide anaesthesia, airfilled cuff volume increased due to diffusion of N_2O and damages the tracheal mucosa.[13] The cough receptors in the tracheal mucosa can be blocked topically by filling the endotracheal tube cuff with buffered lidocaine, as this helps in diffusion of the uncharged base form of the drug across the hydrophobic polyvinyl chloride (PVC) wall of endotracheal tube cuff.[9,14] With this background knowledge, this study was undertaken to determine the benefits of filling endotracheal tube cuff with buffered lidocaine, plain lidocaine or air to prevent endotracheal tube induced sore throat after extubation.

Estebe J P et al[8] used visual analogue scale from 0-100 mm to assess the post-operative sore throat at 15minutes, 1hour, 2hours, 3hours, and 24hours where they found a more pronounced decrease in sore throat in the alkalinized lignocaine group (VAS-1±3 and 0±3 respectively) at 15 minutes and 24 hours post-operative, when compared to control group (VAS-30±20 and 13±9 respectively) and plain lignocaine (VAS-12±18 and 10±13 respectively). Similar results were recorded in our study where post-operative sore throat was highest in the control group and least in the AL (alkalinized lignocaine) group. It was also found that sore throat decreased gradually over 24 hours in all three

groups. Ahmady M S et al[15] also found significant reduction in the incidence of post-operative sore throat in the alkalinized lignocaine group in the post anaesthetic care unit (PACU) (12%) and 24 hours post extubation (4%) when compared to saline group(44% and 28% in the PACU and 24 hours post extubation respectively). Our study was comparable to the findings in this study except that intracuff air was used in our study instead of intracuff saline. Navarro LHC et al[16] in their study also found that there was no incidence of post-operative sore throat in the alkalinized lignocaine group in the post anaesthetic care unit (PACU) and 24 hours after extubation, when compared to saline group [5(20%) and 3(12%) in the PACU and 24 hours post extubation respectively].

Coughing during emergence from general anaesthesia may be effectively suppressed for a short duration (5 min) by intravenous lidocaine as reported by Yukioka H et al.[17] Lower incidence of cough was reported in our study with alkalinized lignocaine group which was also supported on the study of Ahmady MS et al[15] and Navarro LHC et al.[16] However, Estebe J P et al[8] recorded higher incidence of cough which may be due to the prone positioning of patients as against supine in our study. There was no incidence of restlessness in the AL group with lower incidence of dysphonia and hoarsness, which were in accordance with the study conducted by Estebe J P et al.[8]

The spontaneous ventilation and extubation time was prolonged in the AL group in our study and was also reported by Estebe J P et al.[8] This resulted in increase in endotracheal tube tolerance allowing early reduction of anaesthesia and spontaneous ventilation towards the end of surgery and also decreased adverse effects like postoperative nausea and vomiting.

The haemodynamic variables such as heart rate and blood pressure were increased in all the three groups during extubation, and was recorded highest in the control group and least in the AL group. These similar results were also recorded in the study conducted by Estebe J P et al.[8]

There were several limitations implicated in sore throat that we did not take into account in this study. We did not use humidity moisture exchangers in the delivery circuit, and dry airway gases have been implicated in the development of postoperative sore throat.[18] Airway suction is associated with postoperative sore throat and this was not standardized. Intubation was done by residents and staff with wide range of experience. Another limitation was that the plasma concentration of lignocaine was not measured in our study.

The incidence of sore throat was less when intracuff alkalinized lignocaine was used rather than plain lignocaine. Throat pain, restlessness, dysphonia and hoarseness were most common in the control group in which air was the inflating medium and lesser in the alkalinized lignocaine group. Moreover in our study we used a solution closer to the physiological pH and a small dose of lignocaine hydrochloride, which reduced the risk of vascular absorption and mucosal irritation of local anaesthetic in case of endotracheal tube cuff rupture, although there was no incidence of cuff rupture.

CONCLUSION

Our study demonstrated a decrease in the incidence of sore throat and other indirect effects of tracheal extubation such as hemodynamic changes, restlessness, dysphonia and hoarseness during the postoperative period when the endotracheal tube cuff was inflated with alkalinized lignocaine rather than plain lignocaine or air. To conclude, use of intracuff alkalinized lignocaine will increase the endotracheal tube tolerance by reducing the incidence of emergence phenomena.

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ORIGINAL PAPER

Fine Needle Aspiration Cytology (FNAC) of Thyroid Neoplasms

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ABSTRACT

***Background:** Evaluation of diagnostic value of fine needle aspiration cytology in diagnosis of neoplastic lesions of thyroid gland. **Materials and method**: it is a crossectional study of 47 neoplastic lesions of thyroid out of 343 thyroid FNAC. Results were analysed according to the Bethesda classification . Histopathological diagnmosis were considered the gold standard. **Results:** Total 47 neoplastic cases were analysed. Female to male ratio was 4.2:1, and common age group was 21-40 years.Twoentycases(42.55%) were diagnosed as follicular neoplasms ,22 cases(46.81%) as malignant and 5 cases(10.64%) as suspicious for malignancy.Papillary carcinoma was most commonly encountered malignant neoplasm (31.91%). Cytologicdiagnosis were compared with corresponding histologic ones whenever possible. FNAC achived a diagnostic accuracy of 95.0% and false positive rate of 5.0% . **Conclusion:** FNAC is highly accurate first line diagnostic technique for the evaluation of neoplastic lesions of thyroid.*

***Keywords**: Neoplastic lesion, Bethesda classification, histopathology, diagnostic accuracy*

INTRODUCTION

Thyroid is an endocrine gland and can be affected by various disorders of endocrine, inflammatory or neoplastic origin. Thyroid nodules are common clinical findings and have a reported prevalence of 4-7% of adult population. However fewer than 5% of adult thyroid nodules are malignant and the vast majority is non neoplastic lesions or benign neoplasms. It is preferred to operate only on those patients with lesions suspicious of cancer, thereby avoiding unnecessary surgery and possible injury of the recurrent laryngeal nerve.[1] A cytological diagnosis of malignancy allows the patient to be informed that an operation for cancer is likely and preoperative staging procedure to be carried out.[2]

FNA biopsy is the most preferred test and has improved the selection of patient for thyroid surgery.[3,4] Incidence of malignancy at thyroidectomy has increased from 5-10% to 30-50% over the recent years following the use of FNA.[5] Confirmation of clinically obvious malignancy in particular anaplastic carcinoma and malignant lymphoma, spares the patients additional invasive diagnostic procedure. A cytological diagnosis allows preoperative irradiation or palliative therapy. FNAC is also valuable in metastatic disease, both to identify metastatic tumors in the thyroid and to diagnosed distant metastasis of thyroid cancer.[2]

MATERIALS AND METHODS

This is a cross-sectional study that provides cytomorphological analysis of thyroid neoplasms at Gauhati Medical College and Hospital, Assam, India, from September 2011 to August 2014. Ethical clearance was obtained from hospital administration. All total 47 neoplastic lesions out of 343 thyroid swellings (both neoplastic and non neoplastic lesions)were analysed. All cases within age group 0 to >60 years, both sexes are included in the study and all non tumorous benign lesions and inconclusive aspirates were excluded from the study.

FNAC was performed using a 22 gauge needle. An average two passes was performed and minimum 4 slides were prepared. Two slides were air dried and stained by Giemsa stain, while the remaining two slides were fixed in equal parts of ether alcohol mixture and then stain with PAP (Papanicolau) stain. Smears

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showing enough cellular material to provide a diagnosis were considered satisfactory. In this study FNAC results were correlated with histological findings, whenever available.

All data collected were thoroughly cleaned and entered in to MS- Excel spread sheet and analysis were carried out. Statistical analysis was done to find out the diagnostic accuracy of the FNAC. Association between the variables were calculated by students exact test & "p" value of <0.05 was taken as being significant.

RESULTS

Total numbers of thyroid neoplasms 47, out of 343 thyroid FNAC are analysed. Highest numbers of cases are seen in the age group of 21 to 40 years of age group (**Table 1**). Highest relative frequency of thyroid neoplasms, 0.468 can be seen in the age group 21 to 40 years with a simple frequency 22 and percentage of frequency 46.800 (Table 2). In male highest relative frequency 0.444 can be seen in the age group both in "21 to 40" and "41 to 60" years with a simple frequency 4 and percentage of frequency 44.500 (**Figure 1**). In female highest relative frequency 0.474 can be seen in the age group 21 to 40 years with a simple frequency of 18 and percentage of frequency 47.400; (**Figure 1**). Most common diagnosis is follicular neoplasms followed by papillary carcinoma (**Table 3 and Figure 2**). Biopsy was available in 20 cases for histopathological examination, out of these a sum of 19 cases were consistent with cytological diagnosis with mean 3.800, standard deviation 4.817, standard error of mean 2.154 which is seen in the . Whereas in one case histopathological diagnosis was inconsistent with cytological diagnosis with mean 0.200, standard deviation 0.447, standard error of mean 0.199 (**Table 4**). In thyroid neoplasmas we got 7 (True negative) cases of benign neoplasms (cytologically and histologically benign), 12 (True positive) cases of malignant neoplasm (cytologically and histologically malignant), 1 false positive (F.P) case, no false negative (FN) case was detected. This gives diagnostic accuracy of 95% and 5% F.P. rate. In this study we got $P< 0.001$; $t = 6.809$ for thyroid neoplasms in male and female which is statistically significant.

Table 1 Number of thyroid neoplasms in different age group in male and female

Thyroid Neoplasms		
	Number of cases	
Age in years	Male	Female
0 to 20	0	4
21 to 40	4	18
41 to 60	4	15
More than 60	1	1
Sum	**9**	**38**
Mean	**2.25**	**9.5**
SD	**±2.062**	**±8.266**
SEM	**±1.031**	**±4.133**
N	**4**	**4**

Table 2 Distribution of frequency of different types of thyroid neoplasms

Class interval in years	Thyroid neoplasms		
	F (Frequency)	Fr (Relative frequency)	f% (Percentage of frequency)
0 to 20	4	0.085	8.500
21 to 40	22	0.468	46.800
41 to 60	19	0.404	40.400
Above 60	2	0.043	4.300
Sum	**47**	**1.000**	**100.000**

Table 3 Numbers of different type of thyroid neoplasms

Neoplastic lesions of thyroid	
Cytodiagnosis	**Number of case**
Follicular neoplasm	20
Papillary Carcinoma	15
Suspicious of malignancy	05
Medullary carcinoma	02
Anaplastic carcinoma	05
SUM	47

Table 4 Histopathological consistency with cytodiagnosis in thyroid neoplasms

Histopathology consistency with cytodiagnosis				
Cytodiagnosis	**Cytopositive cases N=47**	**HPE available Cases N=20**	**HPE consistent with cytodiagnosis**	**HPE inconsistent with cytodiagnosis**
Follicular neoplasms	20	11	10	01
Papillary carcinoma	15	08	08	00
Suspicious malignancy	05	01	01	00
Medulary Carcinoma	02	00	00	00
Anaplastic carcinoma	05	00	00	00
SUM			**19**	**1**
Mean			**3.800**	**0.200**
SD			**±4.817**	**±0.447**
SEM			**±2.154**	**±0.199**

(**N.B.** There are 10 cases of follicular neoplasms in which HPE is consistent with cytodiagnosis. Out of these 10 cases, 7 are adenomas and 3 are carcinomas.)

Table 5 Comparison of diagnostic accuracy with other studies

Authors	Diagnostic accuracy
Arup Sengupta et al (2011)[13]	97%
HeydarAli, HassanTaghipur (2012)[10]	93.6%
E.A. Sinna,N. Ezzat (2012)[1]	98.8%
SuninaBamanikar (2014)[7]	94.2%
Present study (2015)	95%

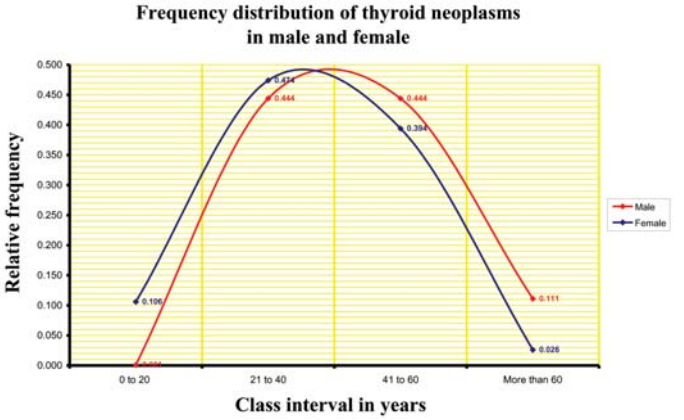

Figure 1 Frequency distribution of thyroid neoplasms in different age group in male and female

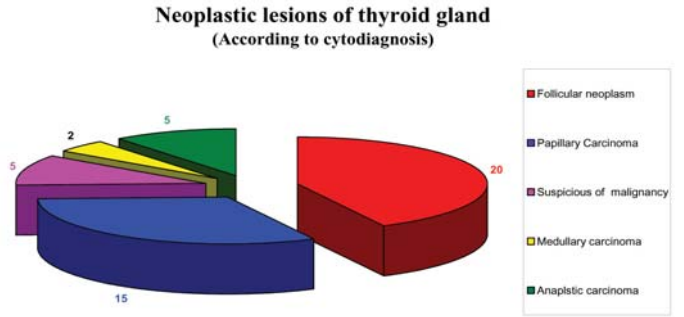

Figure 2 Pai chart showing numbers of different type of thyroid neoplasms

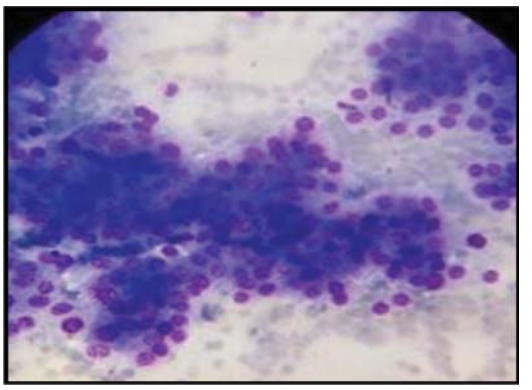

Figure 3 Cytological smear of follicular neoplasm of thyroid gland(MGGX100)

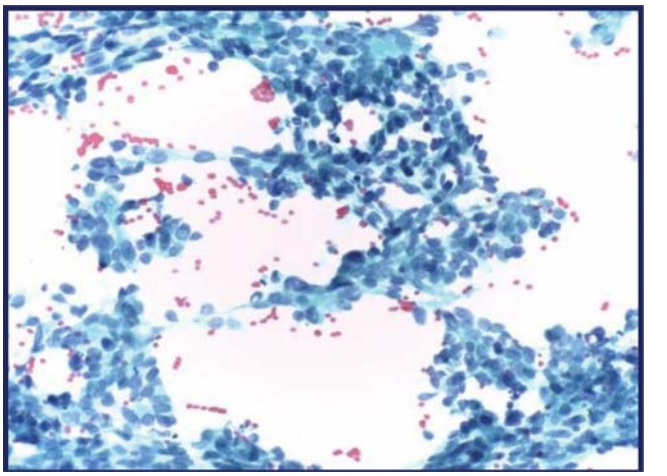

Figure 4 Cytological smear of papillary carcinoma thyroid(Pap x100)

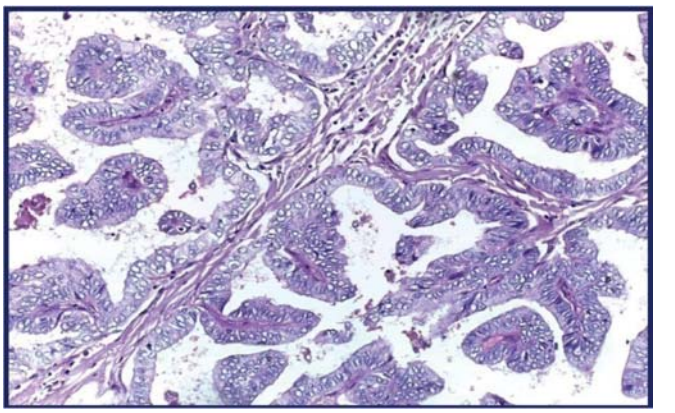

Figure 5 Tissue section from paoillary carcinoma thyroid (H&E x400)

DISCUSSION

In the present study most cases of thyroid neoplasms were found in the 21-40 years age group which is similar to studies done by E.A Sinna (2012)[1] and GunvantiRathod (2012).[6] In our study we found female predominance. Thirty nine female cases and 9 male cases were found, giving the female: male ratio=4.2.1 ($t = 6.089$, $p < 0.001$). E.A Sinna and Gunvanti Rathod reported F:M ratio 5.2:1 and 4:1 respectively which are similar to the present study.

Thyroid nodule presents a very common clinical problem and the differential diagnosis include cancer.[8]Here we recorded the diagnosis as per the criteria laid down in the standardized nomenclature of the Bethesda system. According to Bethesda system of categorization, "follicular neoplasm"/"suspicious for FN", "suspicious for malignancy" and "malignant" categories were included in our study and analysed. "Benign" and "atypical follicular lesion of undetermined significance" were excluded.

In the present study we got total 47 neoplasms out of these 20 cases (42.55%) were follicular neoplasm, 15 cases (31.91%) were papillary carcinoma, 5 cases (10.64%) suspicious of malignancy, 2 cases (4.26%) were medullary carcinoma, 5 cases were (10.64%) anaplastic carcinoma.

Overall we got 42.55% cases of follicular neoplasm, 46.81% cases

of malignant neoplasm and 10.64% cases of suspicious of malignancy. Santosh Mandal[9] reported out of 93 neoplastic lesions 38.71% follicular neoplasms (F.N), 12.90% suspicious for malignancy, 48.39% malignant neoplasms. E. A. Sinna (2012)[1] reported out of 121 neoplastic lesion of thyroid, 40.5% follicular neoplasms (F.N)., 24.79% suspicious for malignancy, 34.7% malignant neoplasms. Hyder Ali (2012)[10] reported 18.66% of suspicious for malignancy and 7.8% malignant neoplasms. Findings of the present study correlated well with other studies.

Out of 47 cases of thyroid neoplasms histopathology was available in 20 cases (42.5%) . Of these 20 cases,10cases were follicular neoplasms [7 cases(70%) were follicular adenoma and 3 cases(30%) were follicular carcinoma] (Fig 3); 8 (40%) cases were papillary carcinoma(Fig.4,5); one case (5%), suspicious for malignancy proved as papillary carcinoma on histopathology. One case (5%) cytologically diagnosed as follicular neoplasm was inconsistent and proved as adenomatoid nodule on histopathology. Medullary carcinoma and anaplastic carcinoma were not available for histopathological examination (HPE). Out of 11 cases of follicular neoplasms available for histopathogy 10 cases were consistent, one case (5%) cytological diagnosis was inconsistent and diagnosed as adenomatoid nodule on histopathology (False positive). This gave 5.0% false positive (FP) rate. Which is similar to other study which cite F.P. rate 0-9%.[11,12]

In the category of follicular neoplasm or suspicious for follicular neoplasm (F.N/SFN), percentage of malignancy risk was 27.27%. Only one out of 5 cases of suspicious for malignancy was available for histopathology and it was turned out as papillary carcinoma giving malignancy risk 100% in this category. Eight cases were available for histopathologcal examination (HPE) in "malignant" category. All 8 cases (100%) were malignant (papillary carcinoma) on histopathology (H.P) giving malignancy rate 100%. Findings of malignancy rate are compared with S.KumarMandal et al (2013)[9].

In this study diagnostic accuracy of FNAC in thyroid neoplasms was 95% which is comparable to other studies (**Table 5**).

In the present study it was noted that fine needle aspiration cytology of thyroid gland has certain limitations on account of an intermidiate/suspicious diagnosis. Intermediate FNAC results and cytodiagnostic error are unavoidable due to overlapping cytological features, particularly among hyperplastic adenomatoid nodules, follicular neoplasms, and follicular variant of papillary carcinoma.[14]In the present study among the follicular neoplasms 3 cases were malignant (F.carcinoma) and 7 cases were benign (follicular adenoma) on histopathology. It was not possible to group them in either benign or malignant cytologically. This was mainly due to the limitation of thyroid cytology to distinguish follicular adenoma from follicular carcinoma. The diagnosis required a detailed histopathological examination for vascular and capsular invasion which is possible only on histopathology of biopsy specimens. As the risk of malignancy in intermediate /suspicious category is high, surgical removal of the thyroid swelling should be considered strongly in these cases.

Inadequate samples /haemorrhagic aspirates also another diagnostic difficulty we faced for which we had to repeat the procedure. Because of high vascularity of the gland, large area of cystic degeneration most of the time blood was aspirated and smears were hypocellular. The use of ultrasound guided (USG) FNA improves sample acquisition and can reduce the sampling error. The cytopathologist should be aware of the potential diagnostic pitfalls and the interpretational error that can be reduced further if the aspirate are obtain from different portion of the nodule/swelling with the use of the ultrasound guided FNA procedure, with expert cytopathologist to perform and interpret the aspirates.

CONCLUSION

FNAC is a highly accurate initial diagnostic test for evaluation of patients with neoplastic lesions. Multiple passes from different sites and ultrasound guided FNAC are advisible and smears should be viwed with caution to avoid false positive diagnosis and unnecessary surgical procedure.

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ORIGINAL PAPER

Knowledge and Attitude Towards Mental Illness Among the Students of Selected Urban Colleges

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ABSTRACT

Introduction*: Mental illness has always been an important area of investigation among the mental health professionals as every section of society has its unique way of perception about mental illness, particularly the young generation and the college-going students.* ***Methods****: A descriptive study design was undertaken where the sample included 500 students from selected urban colleges from I yr, II Yr and III Yr Degree courses in Arts, science and Commerce stream. Tools used: A socio-demographic data, a self structured knowledge and attitude questionnaires were used, validated by 35 experts from the field of Mental Health Nursing, Psychiatry, Clinical Psychology and Statistics. The sampling technique adopted for the study was simple random sampling.* ***Results****: The study found the mean knowledge score to be 17.84 with SD = 5.32 along with the mean attitude score of 75.14 with SD = 9.87. A significant positive correlation has been found between the knowledge and attitude, which is found to be statistically significant at 0.01 & 0.05 levels.* ***Conclusion:*** *The study findings suggests the need of proper awareness programmes among the student community, which would help dispel any myths and misconceptions regarding mental illness, thus improving the mental health of the students and bring about an understanding and acceptance of the people with mental illness in the society.*

Keywords*: Mental Health Professionals, Descriptive Study, Student Community*

INTRODUCTION

Mental illness has always been an important area of investigation among the mental health professionals as every section of society has its unique way of perception about mental illness, particularly the young generation and the college-going students. College has remained the best place to develop a comprehensive mental health program, because the attitude and values of college-going students influence the society most.[1] It is also found through recent studies that stigmatizing attitudes towards people with mental illness are widespread[2] and are also commonly held.[3] There still exists a stigma surrounding individuals who need or use psychiatric mental health services.[4] The stigma attached to mental illness is the main obstacle to better mental health care and better quality of life for people who have the illness, for their families, for their communities and for health service staff who deal with psychiatric disorders.[5] Whatever picture people frame in their mind regarding mental illness generally guides their behaviour, so public must be educated to bring about positive changes in attitude.[6] Hence, a descriptive study was undertaken with an aim to assess the knowledge and attitude towards mental illness among the students of selected urban colleges of Upper Assam.

Objectives: (1.) To assess the knowledge and attitude towards mental illness among the students of selected urban colleges. (2.) To determine the relation between knowledge and attitude towards mental illness among the students of selected urban colleges. (3.) To find out the association between knowledge and attitude and socio-demographic variables towards mental illness among the students of selected urban colleges.

MATERIALS AND METHODOLOGY

The descriptive research design was used for the present study. The sample size was 500 urban college students from I yr, II Yr and III Yr Degree courses in Arts, Science and Commerce stream. Simple random sampling technique was used to select the

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students who fulfilled the inclusive criteria. The study was conducted in JB College Jorhat, NLK College Lakhimpur and in DHSK Kanoi College Dibrugarh in the month of July 2015. The prior permission was obtained from the respective Principals of the colleges. The informed consent was obtained and the purpose of the study was explained to the students. Tool used: Socio-demographic data sheet, Self structured knowledge questionnaire which included 37 items; 7 items on meaning of mental illness, 7 items on types of mental illness, 5 items on signs & symptoms, 4 items on causes of mental illness, 14 items on treatment of mental illness for knowledge and a self structured three point likert scale attitude questionaire consisting of 35 items with 9 items in response behaviour and 26 items in acceptance behaviour, was used which were validated by 35 experts from the field of Psychiatry, psychiatric nursing, Clinical Psychology and Statistics. The reliability coefficient of the knowledge tool was found to be 0.792. The reliability coefficient of the attitude tool was found to be 0.770.

The data analysis was consisted of descriptive and inferential statistics, the statistical tests used were Chi square test and Karl Pearson's correlation test. The significance level used was $p<0.05$ to determine the association between knowledge and attitude and selected demographic variables.

RESULTS

The mean age was found to be 19.15 with SD=1.163, with higher percentage of female students of 51.4% than 48.6% male students along with maximum percentage 36.2% of students from TDC I yr, followed by 33.4% in TDC II yr and 30.4% in TDC III yr. 57.4% of the students were from the Arts stream, 33.8% students from Science stream and 8.8% students were from the Commerce stream. The educational status of majority, 426% of the fathers was Graduate/Postgraduate, followed by 28.6% from High School, 10.8% from Professional Degree, 10.6% from Intermediate/ Diploma, 4.8% from Middle School, 2.4% from primary School and .2% were illiterate, whereas the educational status of majority, 40.8% of the mothers was High School, followed by 25.8% from Graduate/Postgraduate, 10.4% was Intermediate/Diploma, 8.8% from middle School, 5.8% from Primary School, 4.4% were illiterate and 4.0% were from Professional Degree. Occupational status of majority 47.0% of the fathers was Govt. Service, 30.2% were into Business, 9.4% were in Private Service, 8.4% was involved in Agriculture, 3.4% were Professionals and 1.6% were unemployed, whereas majority 63.2% of the mothers were unemployed, followed by 16.4% were from Govt. Service, 7.6% were into Agriculture, 5.4% were from Private Service, 4.2% were into business and 3.2% were professionals. Majority 47.8% students belonged to the > Rs 20000/- per month family monthly income group, followed by 21.4% from Rs 10,000-19,999/-per month group, in Rs 7500/- to Rs 9999/- and Rs 5000/- to Rs 7499/-per month group, there were 8.8% families each, 7.6% belonged to the Rs 3000/- to 4999/-per month group and 4.2% students belonged to the Rs 1001/- to 2999/- per month group of family monthly income. 68.2% of the students were from Nuclear families followed by 27.0% from joint families and 4.8% were from Extended families. 31.4% of the students had TV/Radio/cinema as source of Mental Health information, 15.4%, 14.2%, 8.4%, 4.8% of the students had Health Personnel, Newspaper/Magazine/Books, Relatives/ Family Members and Friends/Neighbours as source of Mental health information respectively. 7.4% of students gave multiple responses whereas 18.4% students did not have any prior information on Mental Health. 95.0% of the students had Family History of Diagnosed Mental Illness while 5.0% did not have any such history. Health centres were on an average nearer in urban areas (M = 3.43, SD = 2.05).

The mean Knowledge Score of the students was found to be 17.84, SD=5.32 whereas the mean attitude score was found to be 75.84, SD=9.87. Aspect wise mean knowledge score was: meaning of Mental Illness=4.06, SD=1.49; Types of Mental Illness=4.00, SD=1.78; S&S of Mental Illness=2.13, SD=1.12, Causes of Mental illness=1.44, SD=1.05; Treatment of Mental illness=6.21, SD=2.43. Aspect wise mean attitude score was: Acceptance Behaviour=55.32, SD=7.83; Response Behaviour=19.97, SD=2.97.

Table 1 Relation between knowledge and attitude among the students

			Attitude			
			Unfavourable	Moderate	Favourable	Total
Knowledge	Inadequate	Count	9	67	7	83
		% within Attitude	13.8%	21.3%	5.8%	16.6%
		Std. Residual	-.5	2.0	-2.9	
	Moderate	Count	51	186	71	308
		% within Attitude	78.5%	59.0%	59.2%	61.6%
		Std. Residual	1.7	-.6	-.3	
	Adequate	Count	5	62	42	109
		% within Attitude	7.7%	19.7%	35.0%	21.8%
		Std. Residual	-2.4	-.8	3.1	
Total		Count	65	315	120	500

Table 1*Chi sq(500, 4)= 32.437, P<.001 Significant.*

Table 2 Pearson Correlations of Knowledge and attitude in Aspect Wise

Aspects of Knowledge		Acceptance Behaviour Score Urban	Response Behaviour Score Urban	Attitude Score Urban
Meaning of mental illness	*R*	.209(**)	.130(**)	.201(**)
	P	< .001	0.004	< .001
Types of mental illness	*R*	.309(**)	.286(**)	.344(**)
	P	< .001	< .001	< .001
S&S of mental illness	*R*	0.062	0.063	0.076
	P	0.166	0.159	0.089
Causes of mental illness	*R*	0.066	.101(*)	.089(*)
	P	0.139	0.025	0.046
Treatment of mental illness	*R*	.177(**)	.207(**)	.219(**)
	P	< .001	< .001	< .001
Knowledge Score	*R*	.269(**)	.260(**)	.305(**)
	P	< .001	< .001	< .001

Table 2 *** Correlation is significant at the 0.01 level (2-tailed).*
* *Correlation is significant at the 0.05 level (2-tailed).*

Table 1 & 2 reveals that the Attitude of Urban students was significantly associated to Knowledge, Chi sq (500,4)=32.437, *P*<.001. Post hoc Chi sq test by standardized residual revealed that inadequate knowledge and moderate and favourable attitude (std residual=2.0, -2.9 respectively); also adequate knowledge and unfavourable attitude and favourable attitude (std residual= -2.4, 3.1 respectively), significantly contributed to the association. The same was confirmed by significant Pearson Correlation (r=.305, *P*<.001). The Pearson Correlations were also computed for each component of knowledge and Attitude. It revealed that Meaning of Mental Illness was significantly related to Acceptance behaviour (r=.209, *P*<.001) and Response Behaviour (r=.130, *P*<.001); Types of Mental Illness was significantly related to Acceptance behaviour (r=.309, *P*<.001) and Response Behaviour (r=.286, *P*<.001); Also Treatment of Mental Illness was significantly related to Acceptance behaviour (r=.177, *P*<.001) and Response Behaviour (r=.207, *P*<.001).

DISCUSSION

The finding of moderate level of knowledge among urban college students 61.6% (mean=17.62, SD=2.68) may be due to the better access to both print and electronic media as evident by the response of the urban college students in the socio-demographic data regarding source of mental health information, followed by 7.4% giving multiple responses. Similar findings were reported by Amy C. Watson[7] et al., where they found that students had some understanding of mental illness as a problem of the brain with biological and psychosocial causes. The study found that the attitude towards mental illness among the urban college students was moderate (63.0%) followed by favourable (24.0) which is supported by the findings reported by Ahmed Waqas[8] et al., who found positive attitude towards mental illness among the students, where it can be inferred that with proper awareness and motivational drives the attitude of the students can be channelized for the better understanding and acceptance of the Mental Illness, as marked by Brown[9], that the hallmark of adolescent psychosocial functioning happens to be the heightened importance of peer influence. The finding of a significant association of knowledge with the demographic variable of sex among urban respondents regarding mental illness at Chi sq (500,2)=9.838, P=.007 was supported by Nimesh Parikh[10] et al., who found that females had comparatively more knowledge than males. The finding of a significant association of knowledge and economic condition among urban respondents is supported by the findings of Vijay P More.[11] A significant association of knowledge regarding mental illness among the urban respondents with the demographic variables of educational status of father at Chi sq(500,1200=28.716, P=.004; educational status of mother at Chi sq(500,12)=31.185, P=.002; Occupation of father at Chi sq(500,10)=26.558, P=.003; Occupational status of mother at Chi sq(500,10)=20.710, P=.023; type of family at Chi sq(500,4)=19.513, P=.001; family monthly income at Chi sq(500,12)=35.872, PÂ.001; source of mental health information at Chi sq(500,12)=28.341, P=.005; family history of mental illness at Chi sq(500,2)=7.609, P=.022 was found in the present study. However, no significant association of age, educational status and distance to nearest health centre with knowledge towards mental illness was found. No significant association of attitude could be found with the demographic variables of sex, stream of education, educational status of father & mother, occupational status of mother, family monthly income and type of family. The finding of a significant association between attitude and the demographic variable of distance to nearest health station at Chi sq(500,6)=16.931, P=.010 can be attributed to the presence of better health care services in urban areas. A significant association between attitude and the demographic variables of educational status, knowledge and stream of education among the urban respondents is supported by P Vijayalakshmi[12] et al., with the findings that college students' attitudes towards people with mental illness vary based on the course that they are enrolled in. At Chi sq(500,4)=22.539,PÂ.001, age is found to be significantly associated with attitude also the occupational status of father at Chi sq(500,10)=15.716, PÂ.001 is found to be significant. The significant association of source of mental health information at Chi sq (500,12)=50.722, PÂ.001 and attitude towards mental illness was found in the present study.

The influence of family members can be understood with the findings of the significant association of attitude towards mental illness and family history of mental illness at Chi sq (500,4)=7.503, P=.023.

CONCLUSION

The findings of 17.84% mean knowledge score followed by 75.14% mean attitude score among the urban college students indicates the need for educational programmes to be implemented in the collegiate program to equip the younger generation with adequate knowledge, which would develop favourable attitude towards mental illness, which is essential for the better treatment and follow up of mental illness. Also, the study findings suggests the need of proper awareness programmes among the student community, which would help dispel any myths and misconceptions regarding mental illness, thus improving the mental health of the students and society at large.

Conflict of interest: None declared.

Ethical clearance: Taken.

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Clinical and Functional Outcomes of Open Reduction and Internal Fixation in Fresh Displaced Pilon Fractures

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ABSTRACT

Introduction: *There are several methods for treatment of pilon fracture. We propose to evaluate the clinical and functional outcome in terms of union of the fracture, mobilisation, weight bearing, infections and wound coverage after open reduction and internal fixation in closed fresh displaced pilon fracture with the help of distal tibial locking compression plate. Even though we have conducted this study to compare our results with the various national and International studies.* ***Method:*** *We have conducted a prospective study for 40 cases of Fresh displaced tibial pilon fractures in patients aged between 18yrs - 65yrs attending the OPD and Emergency department of Orthopaedics, Gauhati Medical College & Hospital, Guwahati who met the inclusion criteria outlined below. Patients were treated by open reduction and internal fixation of the fractures with Distal Tibial lock plate with or without Fibula plating.* ***Results:*** *Patient were followed up for two years evaluated by AOFAS score and compared with standard study. From our study we have obtained 21(52.5%) of patients have Excellent result, 10(25%) of patients have Good, 7(17.5%) patients have Fair and 2(5%) have poor result.* ***Conclusion:*** *Restoration of length, articular reduction, articular congruity, axial and rotational alignment with better soft tissue handling are key to excellent functional results following fractures of tibial pilon. Final outcome depends upon chondral damage, residual articular displacement, soft tissue scarring and early mobilization.The functional result is directly proportionate to the anatomical reduction and fixation during operation and inversely proportionate to the fracture comminution.*

Keywords*: Articular surface, AOFAS, articular congruity, Distal tibial lock plate*

INTRODUCTION

Pilon fractures often present a challenge to the orthopaedic surgeon. 'Destot' first used the term pilon fracture in 1911. The tibial pilon comprises anatomically the distal end of the tibia including the articular surface. The three- dimensional configuration of this region appears to be designed to increase the area of the articular surface, reducing the stress on the ankle joint. By convention, all fractures of the tibia involving the distal articular surface should be classified as tibial pilon1 fractures, except for medial or lateral malleolar fractures and trimalleolar fractures where the posterior malleolar fracture involves less than 1/3 of the articular surface. Tibial pilon fractures represent <1% of lower extremity fractures and 5-7% of all tibial fractures. The treatment of this type of fracture is of current research interest, since there is no universally agreed treatment method. The choice of treatment must take into account not only the stabilization of the fracture, but also the management of the soft tissue injury which is a frequent cause of subsequent complications2. Great attention must be given to the accurate reconstruction of the articular surface to avoid the development of arthritis of the ankle joint. The greatest challenge to the orthopaedic surgeon lies in the relatively tight soft tissue around the ankle. Successful treatment of displaced pilon fractures requires a thorough understanding of the injury, proper timing of treatment, and use of the proper implant placed in the correct location. Open reduction and internal fixation with distal tibial locking compression plate for pilon fracture with or without fibula fracture fixation may show excellent outcome. The purpose of this study

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is to throw light to the ongoing controversies about the choice of treatment modality, choice of implant and surgical approaches with the aim of increasing the functional outcome reducing the danger of skin complication like infection, sloughing and necrosis and ultimately giving the patient with least morbidity post operatively.

MATERIAL AND METHOD

We conducted a prospective study for 40 cases of Fresh displaced tibial pilon fractures in patients aged between 18yrs-65yrs attending the OPD and Emergency department of Orthopaedics, Gauhati Medical College & Hospital, Guwahati who met the inclusion criteria outlined below.

Inclusion criteria:Those patient who were admitted from from 1st April 2014 to 31st March 2015 are included and who gave written and informed consent. All displaced tibial-Pilon fractures in patients aged 18-65yrs, Closed fracture and Gustilo- Andersion type I compound pilon fracture with closed fibula fracture with Duration of injury < 2 weeks and Ipsilateral hip, knee, and contralateral lower limb functionally good enough, so as not to exert a serious adverse effect on the rehabilitation process. Patients who met the medical standards for routine elective surgery.

Exclusion criteria: Patients who do not give consent were excluded. Patients age <18 years and >65 years,Inability to take part in post operative rehabilitation, All compound fractures except Gustilo-Anderson Type 1 fractures, Medical contraindications to surgery, Duration of injury > 2 weeks, Associated ipsilateral or contralateral major limb injury affecting treatment or rehabilitation protocol,Doubtful neurovascular status of the limb. Patients with multiple major bone fractures were also excluded.

Choice of implants and Approaches: AO LCP medial distal tibial plate were selected in 43B and 43C fractures with medial comminution. In these cases we used Antero-medial approach for better visualization of fracture. AO LCP lateral distal tibial plate were selected in 43B and 43C with anterior and anterolateral comminution. In these cases we used Anterolateral approach. Associated fibular plating were done in cases where - Fibula fracture is above the ankle joint line, associated with syndesmotic.

OBSERVATION AND RESULT

Our study was conducted from 1st April 2014 to 31st March 2015. We came across 40 cases of pilon fractures. All the patients were followed up for a minimum period of six months and maximum period for 18 months. Follow up was carried out at 4, 6, 12, 16, 20 weeks and then at 6 monthly intervals. Full assessment was done at the end of 4 months from the date operation in all cases.

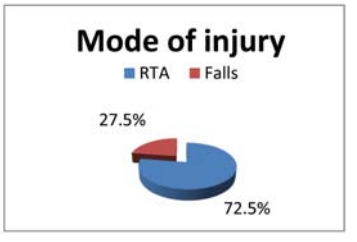

Figure 1 Mode of Injury

Table 1 Mode of injury

Study (Years)	RTA	Fall	Others
Roshdy et al[3],2003	66.67%	16.67%	11.11%
Singh et al[4],2011	72%	28%	0
Shabbir et al[5],2011	72.6%	38.36%	2.74%
Present study,2015	72.5%	27.5%	0

AO classification of fractures: The most common pattern of fracture was AO 43B2 (32.5%)

Table 2 AO classification of fractures

Fracture pattern	No. of patients	Percentage	Tang et al[6] 2012
43B1	5	12.5%	16.82%
43B2	13	32.5%	8.41%
43B3	5	12.5%	19.63%
43C1	9	22.5%	4.68%
43C2	6	15%	14.01%
43C3	2	5%	39.25%
Total	40	100	100

AOFAS score result: The functional result at union, as assessed by the AOFAS scoring system showed that the average in our series is 83.37 (min 58 and max. 90). which was comparable to other studies.

Table 3 Mean AOFAS Score

STUDY	MEAN AOFAS SCORE AT UNION
Borens et al[7] in 2009	86.1
Tang et al [6] in 2012	87.1
Chen et al[8] in 2014	87.8
Present study,2015	83.37

Commencement of partial weight bearing: In our study we have allowed to bear partial weight at an average of 6.8 weeks, min. 6 wks and max. 12 weeks. Full weight bearing was allowed at 16-20 weeks.

Table 4 Average time for partial weight bearing

STUDY (YEAR)	AVERAGE TIME FOR PARTIAL WEIGHT BEARING (IN WEEKS)
Ruedi et a10 in 1979	8-10
Chen at el11 in 2014,	6-8
Present study, 2015	6-12

Union: Overall average union time is 17.16 weeks (16-20 weeks).

Range of motion of ankle: We have evaluated the patient for ankle range motion at union. We observed 8(20%) patient presented with > 30^0, 27(67.5%) patients shows 15^0-29^0 and 5 (12.5%) patients shows <15^o.

Clinical results: Functional results are evaluated according to American Orthopaedics foot and ankle society score**.** Majority (n=21, 52.5%) of the patients in the study had excellent functional results.

Table 5 Functional results

Functional results	Excellent	Good	Satis-factory (Ex+Good)	Fair	Poor
Zeng et al[12] in 2011	28%	50%	78%	17.5%	3.75%
Tang et al [6] in 2012	53%	33%	86%	8.3	4.6%
Our study, 2015	52.5%	25%	77.5%	17.5%	5%

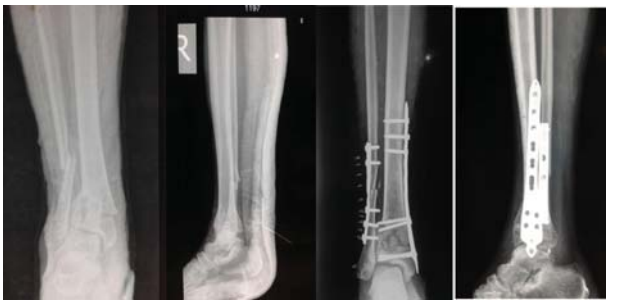

Figure 2 pre and post operative radiograph

Complication: In our study we came across our fair share of complications. There are 2 (5%)cases of superficial infection and 1 (2.5%) deep infection. There are 2 (5%) cases which went for delayed union. 1 (2.5%) case of non-union where there is no signs of union seen till 9 months of surgery. There were 2 (5%) cases of malunion with 10^0 varus angulation. No case of ankle instability was present in our study. There were only 5 (12.5%) patients who had restriction below 15^0 ROM.

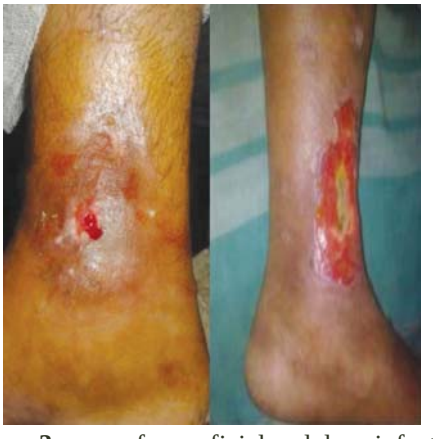

Figure 3 cases of superficial and deep infection

DISCUSSION

Fracture of the distal tibial pilon accounts for only <1% of lower extremity fractures. Commonly associated with complication as there is no universally agreed treatment protocol. The status of soft tissue, degree of comminution, articular incongruity affect long term clinical results. The challenge of achieving satisfactory results by operative procedure has resulted in various modalities of treatment. The goal is to obtain anatomical realignment of joint surface while providing enough stability for early motion. The current opinion favours the adoption of primary open reduction and internal fixation, mainly to reduce such complication and a favorable outcome. However, controversy still remains regarding several aspects of treatment options in pilon fracture. In the present study, road traffic accidents were the commonest mode of trauma. Overall out of 40 cases, in 29 (72.5%) cases the injury was due to road traffic accidents and the rest of fractures occurred due to falls; this was comparable to other studies. This was probably due to the improvement of road condition and high velocity powerful two wheelers available in the market. We allowed partial weight bearing when we saw some evidence of early callus formation. Most of the patients (28/40) were allowed partial weight bearing at 6 weeks following surgery. Other patients were allowed partial weight bearing 6-12 weeks following surgery. This is comparable to other studies. We have allowed complete weight bearing at 16-18 weeks following surgery. Ruedi et al[11], had allowed the partial weight bearing at 8-10 weeks although touch-down, corresponding to about 10-15 kg was permitted earlier. Full weight bearing was started between 14-20 weeks post operatively Chen at el[12] had begun partial weight bearing at 6-8 weeks. Full weight bearing was allowed at 3 months when advanced signs of union were seen on radiograph. We have observed that the result of surgical outcome is inversely proportionate to the comminution of fracture fragments. The result of both the cases of 43C3 is found to be poor.In our series, satisfactory results (Excellent + Good) were found in 77.5%, whether 17.5% were fair and 5% were poor results. This was almost comparable to other studies.

CONCLUSION

Restoration of length, articular reduction, articular congruity, axial and rotational alignment with better soft tissue handling are key to excellent functional results following fractures of tibial pilon. Final outcome depends upon chondral damage, residual articular displacement, soft tissue scarring and early mobilization. The functional result is directly proportionate to the anatomical reduction and fixation during operation and inversely proportionate to the fracture comminution. The principles and procedure of primary open reduction and internal fixation of pilon fracture with distal tibial locking compression plate with or without fibula plating contribute towards optimal reduction and good stabilization in pilon fracture. Complications such as stiffness, can be minimized with early mobilization after relieve of pain post operatively and early physiotherapy. Stiffness is found to be less where wound heals with minimal scar. Overall union rate in our study is comparable with the other major studies done on pilon fracture.

Primary ORIF in fresh displaced pilon fracture gave satisfactory functional results. The anatomical or radiological outcomes did not always correlate with the functional outcomes. The functional outcome was seen to be even better in some of the patients who had less than adequate anatomical or radiological appearance.

Displaced fibular fractures should always be picked up for fibular plating in an attempt to contribute towards greater stability of the ankle mortice.

Limitations: A multi-centric randomized control trial , possibly triple blinded or at least double blinded in nature, involving a large number of patients with long term follow-up is needed to for making the study more significant.

Conflict of Interest : None

Source of Funding : None

Ethical Clearance: Taken

Declarations: (1) The Article is original with the author(s) and does not infringe any copyright or violate any other right of any third parties; (2) The Article has not been published (whole or in part) elsewhere, and is not being considered for publication elsewhere in any form, except as provided herein; (3) All author(s) have contributed sufficiently in the Article to take public responsibility for it and (4) All author(s) have reviewed the final version of the above manuscript and approve it for publication.

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ORIGINAL PAPER

Study of Crime Scene Investigation done in Medicolegal Cases Referred to Medical College of Metropolitian Area

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***Received** on January 30, 2017 **editorial approval** on May 27, 2017*

ABSTRACT

***Introduction**: Forensic Science plays a very significant role in the investigation system. "Crime Scene Examination" refers to an examination where forensic or scientific techniques are used to preserve and gather physical evidence of a crime. **Aims**: The main purpose of study was to collect the important trace evidences related with that particular case and also to get an opinion on issues such as time since death, manner of death, interpretation of injuries, type of weapons, physical evidences found at the scene of crime. **Methods**: In present study 50 detail crime scene investigations were carried out in relation with the autopsies conducted at JJ hospital mortuary over the period of 2 year (July 2012 to July 2014). **Results:** In this study trace evidences such as only blood stain was found in 10 (20%) cases while skin scrapings was taken in 5 (10%)cases. Fingerprints/footprints were taken in 10 (20%) cases. Combination of trace evidences were seen in 11 (22%). During study soft material was used in (26%) cases for causation of injuries. Hanging was most common (47.6%) circumstance of death in suicidal death while strangulation (47.4%) common in homicidal death. Mental illness (66.7%) was most common predisposing factor in suicidal death followed by dispute (73.7%) in homicidal death. **Conclusion:** We tried to relate the collected evidential material and observed findings with the autopsy findings and form a conclusive link between them, which was important for police investigation.*

***Keywords:** Autopsy, Fingerprint, Trace Evidence, Weapon*

INTRODUCTION

Crime is defined as an act or the commission of an act that is forbidden by a public law and that makes the offender liable to punishment by that law. The word "Investigate" means to make a systemic examination or to conduct an official inquiry.[1]

In forensic science, Locard's principal holds that the perpetrator of a crime will bring something into the crime scene and leave with something from it, and that both can be used as forensic evidence He formulated the basic principal of forensic science. "Every contact leaves a trace." This became known as "Locard's exchange principal.[2] Majority of cases involves an element of assault or injury to a victim and one or more scene of occurrences/ crimes.

A fair investigation must include identification and collection of various physical evidences including biological ones and interconnecting them before presentation in the courts of law.

MATERIALS & METHODS

The present study was carried out in Department of Forensic Medicine and Toxicology GGMC Mumbai during the period of 24 months. During study in relation with 50 autopsies, the crime scene investigations were carried out, which include cases of hanging, burns, fall from height, drowning, assault, firearm. The purpose of crime scene visit was to get an opinion on issues like time since death, manner and cause of death, interpretation of injuries, probable weapon and physical evidence found at the scene of crime, consistent autopsy findings. After the completion of autopsy crime scene visit was done along with investigating officer and correlations were made between autopsy findings, spot and inquest panchanama findings with crime scene findings.

RESULTS

Age: In the present study, it has been seen that 13 (26%) of deceased found were in age group of below18 years, 24 (48%) were in the age group of 19-40 years which was maximum, 9(18%) deceased found were in the age group of 41-60years and 4 (8%)

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deceased found were above 60 years of age. In our study, it was seen that male deceased were 35 (70%) in number, female were 14 (28%) in number while the sex of1 (2%) body was not known.

Clothing: Entire clothing was seen in 32 (64%) cases, partial clothing were seen in 17 (34%) cases while clothing was absent in 1 (2%) case. Evidence of any tears, loss of buttons, bullet holes, tears, cuts, etc. on clothing by stab injuries or presence of burning, blackening, etc from firearm correspond with the injuries on the body.

Location of injury: In the present study, it was seen that in majority of cases 26 (52%) injuries were on various body parts. Neck region was involved in 11 (22%) cases. Whole body was involved in 8(16%) cases. Head and face was only involved in 2 (4%) cases.

Type of injury: It was seen in this study that combination of injuries was involved in 17 (34%) cases; abrasion was present in 13(26%) cases. Contused laceration was involved in 4 (8%) cases. Firearm injuries were also present in 4 (8%) cases. Burn injuries were present in 5(10%)cases and stab and incised injuries were involved in 7(14%) cases.

Table 1 Type of injuries

	No of cases	Percentage
Abrasion	13	26
Contused laceration	4	8
Stab & incised wound	7	14
Firearm	4	8
Burn	5	10
Combination	17	34
Total	**50**	**100**

Premises: It was seen that in majority of cases 29 (58%) area of premises was outdoor. In 21 (42%) cases area of premise was indoor.

Causation of injuries: It was seen that soft material was responsible for causation of injuries in 13 (26%) cases. In 12 (24%) cases weapons except firearm like knife and other weapons seen in 5 (10%) cases Injuries by hard rough surface were seen in 12 (24%) cases. In firearm 4 (8%) cases were involved. Burns injuries were seen in 5 (10%) cases.

Table 2 Manner of causation of injuries

	No of cases	Percentage
Soft material	13	26
Hard rough surface	12	24
Weapon except firearm	12	24
Firearm	4	8
Burn	5	10
Water	4	8
Total	**50**	**100**

Predisposing factors: In maximum number of cases 17 (34%) dispute was predisposing factor leading to death it involves family dispute, personal dispute, financial dispute and many more. Mental illness was a predisposing factor seen in 16 (32%) cases.

Cause of death: In the present study, it was seen that haemorrhagic shock was cause of death in 22 (44%) cases while asphyxia & neurogenic shock in 23(46%) and 5(10%) cases respectively.

Circumstances of death: Hanging was mostly seen in 10 (20%) cases followed by strangulation in 9 (18%) cases. Stab injury and accidental fall were alsosignificantly involved in 8(16%) and 7 (14%) cases respectively.

Trace evidences: Trace evidences such as only blood stain was found in 10 (20%) cases while skin scrapings was taken in 5 (10%) cases. Fingerprints/footprints were taken in 10 (20%) cases. Combination of trace evidences were seen in 11 (22%) and trace evidence was not found in 14 (28%) cases.

Table 3 Trace evidences found at crime scene

	No of cases	Percentage
Blood stains	10	20
Skin scrapings	5	10
Fingerprint Footprint	10	20
Combination	11	22
Nil	14	28
Total	**50**	**100**

Gross evidence: In the present study, it was seen that weapon was found as gross evidence in 20 (40%) cases only clothes were found in 8(16%) cases and combination involving clothes and weapons were found in 16 (32%) cases.

Table 4 Gross evidences found at crime scene

	No of cases	Percentage
Clothes	8	16
Weapon	20	40
Any combination	16	32
Nil	6	12
Total	**50**	**100**

Manner of death: It was seen that suicide was probable manner of death in 21 (42%) cases while homicide & accident were probable manner of death in 19 (38%) & 10 (20%) cases respectively.

Figure 1 Deceased body found in a pool of blood in toilet

Figure 2 Dried blood stains on ground floor

DISCUSSION

For any crime scene investigation, the most important thing for investigator is keen and fine observation apart from the assistance required at many places for different purpose. A team of the trained and qualified personnel including forensic expert, trained assistants and police officials is required for collection and correlation of evidence. This study was conducted with a purpose to look into the procedure of crime scene investigations related to various unnatural deaths. As already stated various evidences were collected in the unnatural deaths included in this study. There is paucity of identical study data in the literature for comparison of our study.

In the present study male predominance was seen in suicidal (61.9%) homicidal (73.68%) and accidental deaths (80%) probably due to the fact that males are concerned with violent activities, greater exposure to surroundings and responsibility to solve the family problems, disputes. Females were seen in 38.1% and 28% of suicidal and homicidal cases respectively. In accidental death females were involved very less at 20% as compared to males. A Retrospective study on suicidal cases was conducted by Behera A et al[3] found that male's sex is very prone to take extreme decision 2.7 times more than female sex and commits suicide. Similarly Rastogi A et al[4] and Basappa S et al[5] respectively reported in his study that males were constituted more than 2/3rd (71.75%) of the victims which can be attributed to the aggressive nature of males than females in homicidal deaths.

In the present study, the age group of 19-40 years were mostly involved in suicide (71.42%) and homicidal (42.1%) deaths because of the young adult group is most active group of population and more exposed to external environment, strain and stress of life, outdoor activities, increased aggression and early losing of temper which leads to increase in crime rate by this age group. Singh H et al[6] found that the age group of 21-40 yrs was most prone to suicidal deaths in 62.9%. Behera A et al[3] also reported in his study that suicide is more prevalent during 20 to 40 years of age. Rastogi A et al[4] and Basappa S et al[5] found that age group of 18-40 were most predominant victims of homicide accounting for 64.63% & 61.50% respectively.

According to the data obtained clothes were obtained as a piece of evidence in 28.6% cases of suicide, 5.3% cases of homicide and 10% cases of accidental deaths. Weapons served as evidence in 19% suicide, 84.2% homicide. Clothes and weapons were taken as gross evidence in the study. Whereas dry blood stains, skin scrapings, prints (fingerprints, footprints) and any combination of these were noted under trace evidences. Dry blood stains were collected in 28.5% cases of suicidal deaths, 10.5% cases of homicidal deaths and 30% cases of accidental deaths. Skin scrapings were collected as trace evidence in burn cases in 14.2% of suicidal deaths, 5.2% of homicidal deaths and 10% of accidental for detection of combustible material. Fingerprint and footprint were lifted in only 4.7% of suicidal deaths whereas in homicidal deaths, in 47.3% cases it was collected and nil in accidental deaths. Mukherjee J [7] states that blood stains are very important clue in establishment of identity. In cases of murder and assault, blood stains may establish link between the offence, offended and the offender. It is also useful in establishing the link between an offense and offensive agent.

Blood stains also plays an important role in investigation of death from poisoning, when poison is chemically detected from blood. Mukherjee J [7]states that fingerprints provide the proof that the suspect was present at the scene of crime and raises a presumption of his guilt but it may not be the conclusive proof of his having committed the crime unless confirmed.

The most common predisposing factor leading to death according to this study is mental illness attributing (66.7%), however disputes, love affairs, failure in education, financial problems contributed as predisposing factors (14.3%), (9.5%), (4.8%) and (4.8%) respectively for suicides, whereas dispute (73.7%) is a most common predisposing factor for homicidal deaths. Amongst the predisposing factor leading to accidental death is fear of punishment (40%) followed by loss of consciousness (30%). Chavan K et al[8] in his study noted chronic illness and mental illness were the most common cause of suicide. Hettiarachchi J[9] reported depression as the commonest cause for committing suicides. Lester D[10] noted his study report's psychiatric problems as the predominant antecedent events for suicide followed by alcoholic, love and health problem whereas quarrel as most precipitating factor for homicide followed by robbery & love problem. Sinha U et al[11] noted property disputes and quarrel as the common motive for homicide

In this study hanging (47.6%) is the most common method used other than gunshot (14.3%), cut throat (9.5%), fall from height (14.3%) and burns (14.3%) for suicidal deaths. In cases of homicidal deaths strangulation (47.4%) is most common method used by the assailant to serve his purpose. Ambade V et al[12] reported that poisoning was the commonest method of suicide followed by burning, hanging, drowning whereas blunt trauma was commonest method of homicide followed by sharp trauma, burning and strangulation. Sane M et al [13] states that hanging was the most common cause of death followed by poisoning and burns. In terms of homicide, Rastogi A et al[4] states that in homicide, blunt injuries were commonest pattern followed by sharp object injuries, ligature application in throttling and firearm. In suicide cases the most commonly used ligature material was soft material which accounted for (42.9%) according to this study,

whereas it served as tool in (21.8%) homicidal cases by means of strangulation.

In homicidal deaths weapons except firearms (47.4%) such as knife, dagger, gupti, etc., were mostly used by the assailant to commit homicide. Patel A et al[14] states in his study, 'dupatta' was most commonly used ligature material (67.5 %) which is a soft material and easily available in almost every house. In homicidal cases, Shiv kumar B et al[15] study reflects that the commonest weapon of choice used for homicide purposes is sharp cutting weapons followed by hard and blunt weapons. Usually it is seen that the victim of suicide choose for private places for the commission of the act. This is related in the study where (61.9%) of suicide occurred indoor. Assailant of homicide preyed their victim mostly outdoor (73.7%) according to this study also majority of accidental deaths (70%) occurred outdoor. Ambade V et al [12] in his study states that 77.7% of the victims committed suicide inside their home compared to 12% victims which committed it outside. In homicidal cases 49.4% of victims were killed outdoor whereas 31.5% were killed in their own house.

Though a single comprehensive study including observations of major parameters is not available and attempt has been done in this study to highlight precautions and standard operating procedures in crime scene visit aimed at finding out cause and manner of death. Serious attempt was done in this study to observe evidentiary things like circumstances at the scene, findings of body, post-mortem changes, clothing, blood stains, weapon which are very important as per as connecting a criminal with the victim and the crime scene reasonably helps in determining cause and manner of death.

CONCLUSION

The general awareness regarding contribution of a scene of crime needs to be augmented amongst police investigators, judiciary and Forensic experts. Induction & on the job training programs of these functionaries needs to incorporate medico-legal aspects involved indifferent crimes A separate cadre for medico-legal services is needed at state or central level to meet the requirements of criminal investigation or law enforcement system in the country. More frequent interaction is needed between law enforcement agencies & medical professionals. It is also necessary that there should be quick and better coordination between investigating police officer and doctor for arranging crime scene visit without delay.

Conflicts of interest: None

Contribution of Authors: "I (We) declare that this work was done by the author(s) named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors".

Ethical clearance: Institutional Ethics Committee.

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Estimation of Stature from Measurements of Hand Dimensions

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ABSTRACT

Introduction: *Estimation of Stature is sine qua non in the discipline of forensic anthropometry, especially in doubtful medico-legal cases with mutilated or amputated body parts.* ***Aims:*** *Our study aims to derive a correlation between hand length and stature, and to establish regression formulae to estimate stature when hand length is available.* ***Methods:*** *This study was undertaken on 114 females and 86 males (n= 200) of 17-23 years amongst the cosmopolitan population of Western India. The hand length was measured taking two parameters- from the ulnar head and from the dorsal tubercle of Lister to the tip of the middle finger. Stature was measured with a stadiometer. Mathematical formulae were developed separately for both hands through linear regression.* ***Results:*** *We found a strong positive correlation of hand length and stature, the most significant being the left hand radial length (r= 0.8668).* ***Conclusion:*** *With a paucity of data of this kind in western India, an intelligent conjecture can be made using these regression formulae regarding the stature of an individual for identification purposes. This study also has application in the clinical scenario in diagnosing conditions like connective tissue disorders (disproportionate dimensions of the body).*

Keywords*: Forensic Science, Anthropometry, Hand Length, Correlation, Medico legal cases, Bony landmarks, Regression*

INTRODUCTION

Anthropometry is the science of measurement of the human individual, including a variety of parameters that elucidate dimensions of the different portions of the human body. It includes systematic collection of data on the size, shape and proportion of various body parts, and a relative comparison of these proportions under normal and abnormal conditions.

- The parameters include-
- Height (Stature)
- Hand Length
- Foot Length
- Ear Length
- Waist Circumference
- Width of Trunk
- Circumference of Arms and Thighs
- Neck Circumference et al.

The applications of Anthropometric measurements are multifarious, and also fall within the broader discipline of auxology.

Anthropometry and the dimensions of the human body have fascinated man for many centuries. The first man in documented history to use anthropometry was probably the Roman scholar Vitruvius who in 15 BCE said that the ideal body should be 8 heads high. A number of scientists drew inspiration from this, the most notable of whom was Leonardo da Vinci who drew the famous "Vitruvian man", a nude figure of the most perfectly proportioned man. This figure and the accompanying notes outlined the measurements of an ideal human body, based on Vitruvius' notes and da Vinci's own observations.

In the course of forensic studies, there are a number of cases in which measurement of separate parts of the body is essential; especially to estimate attributes like age, sex, stature of an individual. This is pertinent for studying evolution, ergonomics, diagnosis of malnutrition and obesity.

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In the case of Captain K Nagaraju,[1] a doctor in the Indian Army, the identification of the dismembered body of his wife was carried out by the superimposition technique. In certain places, facilities for such sophisticated methods are not available, primarily due to lack of funds. In our study, by simply measuring the hand length, one can estimate stature by inserting the values in the regression equations, which is cost effective and time-saving.

Stature is one of the most important elements of identification of an individual. Establishment of the identity of an individual is essential in cases when only fragmentary remains of human body are found.[2] Such need may arise from mass disasters i.e. bomb blasts, aeroplane crash, stampede, tsunami, earthquake, flood, cyclones, Terrorist attack, close compartment fire, wars, public vehicle(train, bus, ship, plane etc) accidents etc. Mutilation of body could also be possible by humans, animals or by natural process of decomposition.

Genetic and geographical variations exist in different populations. It is a proven fact that stature can be estimated from hand length.[3-8] There is a paucity of data in Western India; hence there is a need for this kind of a study to be undertaken, to aid in doubtful medico-legal cases where only a few body parts of the victim can be retrieved. This is essential taking into account rising crime rates in Maharashtra. While measuring hand length, soft tissue landmarks were taken in the previous studies.[6, 7, 9-12] We have taken 2 bony landmarks – The Ulnar Head and the Dorsal Tubercle of Lister (on the posterior surface of lower part of the radius), and combined the distances measured from both in a single equation for each hand. The bony landmarks being more reliable have given us a very strong positive correlation (r exceeding 0.85 in all our parameters), which is statistically very significant.

MATERIALS AND METHODS

Duration of Study: 2 months

Place of Study: Forensic Medicine & Toxicology and the Department of Anatomy, Grant Medical College & Sir JJ Group of Hospitals.

Type of Study: Cross-sectional study

Sample Size: 200

Healthy, well nourished subjects were chosen free from any physical ailment or diseases affecting external dimensions of the body or any congenital abnormalities of the upper limb**.**

Those who had undergone recent fractures, amputations or nerve lesions were excluded from the study.

Before beginning this study, the Institutional Ethics Committee's approval was obtained and written informed consent was taken from all the subjects.

The Operational definition of Hand Length: 2 measurements were taken on each hand. (**Figures 1 and 2**)

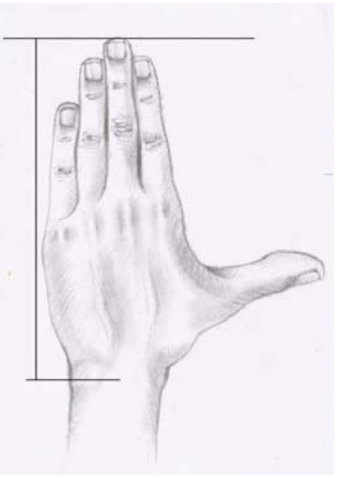

Figure 1 Ulnar length

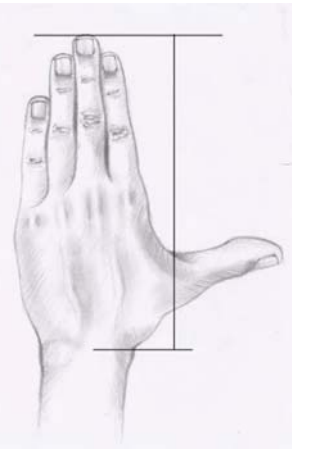

Figure 2 Radial length

1. Ulnar Length - From the Ulnar head on the posterior aspect of Forearm to the tip of the middle finger and

2. Radial Length - From Lister's tubercle on the dorsal aspect of the radius to the tip of the middle finger.

Position - The subject was seated comfortably, with the palm in prone position, fingers adducted and thumb extended. Middle finger was parallel to long axis of forearm. It was measured with the help of a workshop-made graph-scale arrangement (**Figure 2**)

Figure 3 Position of hand on graph-scale arrangement

Stature - Measured as the vertical distance from standing surface to top of head with the help of a stadiometer). Person should stand erect with head in the Frankfurt plane. Heels are together, with weight distributed equally on both feet. Shoulders and the upper extremities are kept relaxed. Measurement taken when subject is breathing quietly (no prior exhausting activities).

Statistical Analysis

Karl Pearson's Correlation Coefficient r was calculated using MS Excel software for the 4 parameters – Right Hand Ulnar, Right Hand Radial, Left Hand Ulnar, and Left Hand Radial Lengths with the Stature.

Linear regression equations were formulated and scatter plots were obtained using MINITAB software. A p value <0.05 was considered to be significant.

OBSERVATIONS AND RESULTS

The study population comprised of individuals aged between 17 and 23 years. Characteristics of the study population are shown in Tables 1, 2 and 3.

Table 1 Stature (cm)

	Female	**Male**
Mean	157.434	170.919
Standard Error	0.587	0.679
Median	157.000	170.250
Mode	157.000	170.000
Standard Deviation	6.270	6.301
Sample Variance	39.316	39.699
Kurtosis	0.544	0.764
Skewness	0.473	0.034
Range	33.500	36.500
Minimum	144.500	152.000
Maximum	178.000	188.500
Sum	17947.500	14699.000
Count	114.000	86.000

Karl Pearson's Coefficients for the parameters are -
Right Hand Ulnar Length and Stature – 0.8553
Right Hand Radial Length and Stature – 0.8509
Left Hand Ulnar Length and Stature – 0.8550
Left Hand Radial Length and Stature – 0.8668
Multiple regression analysis was done and the results are given in table 4.

Table 2 Right hand measurements (cm)

	Ulnar Length		**Radial Length**	
	Female	Male	Female	Male
Mean	17.973	19.892	17.850	19.638
Standard Error	0.080	0.105	0.079	0.105
Median	17.900	19.950	17.700	19.700
Mode	17.600	20.300	17.700	19.700
Standard Deviation	0.854	0.975	0.845	0.971
Sample Variance	0.729	0.950	0.714	0.943
Kurtosis	-0.133	1.438	-0.116	0.572
Skewness	0.439	0.090	0.448	0.024
Range	4.300	6.000	4.200	5.600
Minimum	16.100	16.900	16.000	16.900
Maximum	20.400	22.900	20.200	22.500
Sum	2048.90	1710.70	2034.90	1688.90
Count	114.000	86.000	114.000	86.000

Table 3 Left hand measurements (cm)

	Ulnar Length		**Radial Length**	
	Female	Male	Female	Male
Mean	17.866	19.649	17.913	19.883
Standard Error	0.080	0.101	0.078	0.103
Median	17.750	19.700	17.900	19.900
Mode	17.200	19.700	17.900	20.200
Standard Deviation	0.857	0.932	0.831	0.957
Sample Variance	0.734	0.869	0.690	0.916
Kurtosis	0.189	0.638	0.039	0.910
Skewness	0.453	-0.061	0.388	-0.010
Range	4.700	5.300	4.600	5.600
Minimum	15.700	17.100	15.800	17.000
Maximum	20.400	22.400	20.400	22.600
Sum	2036.70	1689.80	2042.10	1709.90
Count	114.000	86.000	114.000	86.000

Table 4 Regression equations and graphs

Regression Equation		**Actual Data**	**After Removing Points with HI Leverages and Cooks Distance**	**R square**
Right Hand	**Total Sample**	Y=47.632+(3.389)*rh ulnar + (2.787)*rh radial	Y=48.822+(3.693)*rh ulnar+ (2.412)*rh radial	0.741
	Female	Y=64.827+(3.233)*rh ulnar + (1.933)*rh radial	Y=64.48+(4.365)*rh ulnar+ (0.815)*rh radial	0.470
	Male	Y=75.373+(1.463)*rh ulnar+ (3.383)*rh radial	Y=77.065+(0.777)*rh ulnar + (3.971)*rh radial	0.540
Left Hand	**Total Sample**	Y=47.452+(2.015)*lh ulnar+ (4.171)*lh radial	Y=49.076+(1.701)*lh ulnar+ (4.395)*lh radial	0.753
	Female	Y=62.392+(0.911)*lh ulnar+ (4.397)*lh radial	Y=61.117+(0.626)*lh ulnar+ (4.76)*lh radial	0.490
	Male	Y=70.987+(3.068)*lh ulnar+ (1.994)*lh radial	Y=73.201+(3.154)*lh ulnar+ (1.783)*lh radial	0.548

Mini Tab Software was used to plot graphs using our data and Lowess Regression Analysis is depicted in **Figure 4** (Right Hand Measurements and Stature) and **Figure 5** (Left Hand Measurements and Stature).

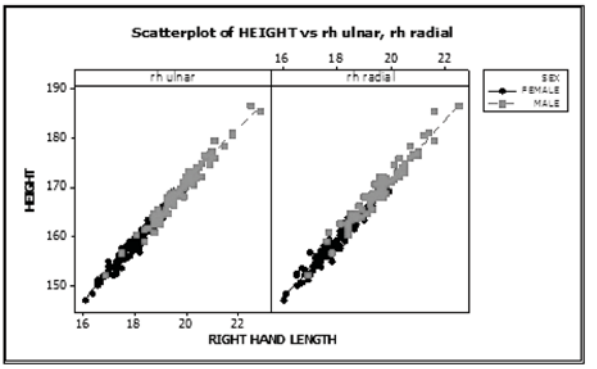

Figure 4 Lowess regression of right hand lengths and stature (rh= right hand, HGT=height)

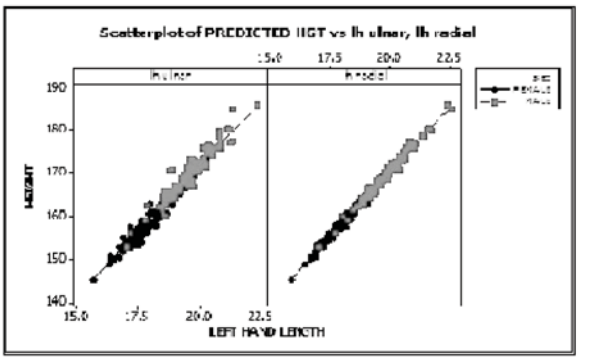

Figure 5 Lowess regressions of left hand lengths and stature (lh=left hand, HGT=height)

DISCUSSION

The aim of our study was to evaluate the accuracy and reliability of using hand length measurements to estimate the stature of an individual. The present study shows a highly significant correlation between hand length and stature, with $p<0.001$.

The best parameter to assess stature was found to be the left hand radial length (i.e. the distance between Lister's tubercle and the tip of the middle finger) with p=5.28*10^-07. Karl Pearson's correlation coefficient for this parameter was 0.8668. In a study conducted by Nilofer et al,[13] the right hand length showed greater correlation with stature (r=0.829) as compared to the left hand (r=0.824).

In a study conducted in Gujarat by Patel et al, arm span (r=0.908) followed by hand length (r=0.806) were found to be the best parameters to assess stature.[3]

Like Nilofer et al,[13] Jasuja O.P. et al,[14] Sanli S et al,[5] Krishnan K et al,[4] Rastogi P et al,[6] Supare et al,[12] we derived regression formulae as well. Pawar et al found that height was approximately 9 times the hand length.[15] There have been studies in the past which correlated the stature and hand length.[16-23] These obtained a positive correlation too, but what sets our study apart from most of these is that we have taken bony landmarks (Ulnar Head and Lister's Tubercle) to measure hand length, which being more reliable than soft tissue landmarks, provide higher precision while calculating stature.

Multiplication factors differed from those obtained in these studies because of the same and also because of genetic and geographical variation.

We have also gone a step further, taking both the ulnar and radial lengths in the same equation, and removing points with Hi Leverages and Cooks distance.

The mean stature of males was 170.919cm, while that of females was 157.434 cm, implying that males are constitutionally taller than females. This is the result of influence of the sex hormones, Oestrogens and Testosterone. The effect of Oestrogen to cause fusion of Epiphysis with shaft of bones is more potent than that of testosterone.[24]

These results are similar to those obtained by Jasuja OP et al,[14] Supare et al[15] and Ilayperuma et al.[9]

Also, mean hand lengths in Males (refer to tables 2 and 3) was found to be greater than that in females. This result is similar to the results obtained in previous studies by Supare et al,[12] Sanli S.G. et al[5] and Lukpata et al.[25]

Variance and standard deviation (Tables 2 and 3) were found to be lesser in females than in males.

Limitations of the Study –

•Sample size is relatively small; hence any conjecture made cannot be extrapolated to the entire human race. •Instrumental and Personal Errors while taking measurements.

CONCLUSION

The present study has established definite strong positive correlation between hand length and stature. We have also obtained Regression Equations and plotted graphs for estimating stature.

This is a study of its first kind, taking into account 2 bony landmarks – namely the Ulnar Head and Lister's tubercle to measure hand length. It will help in several doubtful medico legal cases where only a few body parts of the victim can be retrieved, as well as in mass disasters to identify body parts for adequate disposal as per religious customs. This is important for a city like Mumbai, which being the financial capital of the country, is frequently a target for terrorist activities. In the clinical scenario, this study can aid in the diagnosis of certain congenital anomalies involving disproportionate growth of limbs and body parts.

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Contribution of authors: We declare that this work was done by

the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. Conception of Idea, Aims and Objectives of the Study and Discussion of Results. Supervision of Data Collection – Dr BG Chikhalkar. Collection of Hand Measurements of 200 students and idea to use bony landmarks – Kuber Bhinde. Collection of Stature Measurements of 200 students and review of literature– Shriya Deshmukh. Statistical Analysis of Data – Dr Prashant Howal. Overall Supervision – Dr SD Nanandkar.

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ORIGINAL PAPER

A Study of Serum Total Cholesterol and HDL-Cholesterol in Depression

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***Received** on May 30, 2016; **editorial approval** on July 12, 2016*

ABSTRACT

***Introduction**: In keeping with the emerging danger of depression, this study has been carried out to estimate serum total cholesterol and HDL-cholesterol in cases of depression and compare the levels with that of age and sex matched healthy controls. **Aim**: To measure the serum total cholesterol and HDL-Cholesterol in clinically diagnosed patients with depression and study their levels in different age groups and gender. **Method:** Serum Cholesterol estimation by CHOD/PAP method. HDL cholesterol estimation by PEG/ CHOD-PAP method. **Results**: Serum cholesterol and Serum HDL-Cholesterol were observed to be significantly ($p<0.05$) lower in patients with depression, when compared with that of healthy controls In addition, serum total cholesterol concentration showed a declining trend as the disease progressed from mild to severe. **Conclusion**: It is suggestive that cholesterol may have an important role to play in our efforts to ameliorate the social burden of depression and mitigate the disease progression.A larger sample size, longer duration of study and inclusion of drug-naïve cases could have been more conclusive.*

***Keywords**: Serum lipids, Psychiatry, Assam*

INTRODUCTION

Depression, the common psychological disorder, affects about 121 million people worldwide. World Health Organization (WHO) states that depression is the leading cause of disability as measured by Years Lived with Disability (YLDs) and the fourth leading contributor to the global burden of disease. By the year 2020, depression is projected to reach second place in the ranking of Disability Adjusted Life Years (DALY) calculated for all ages. Today, depression already is the second cause of DALYs in the age category 15-44 years.[1]

25% of the total cholesterol in the body is synthesized in the brain. Among various functions of cholesterol is that it helps in the building of myelin sheath as well as in synaptogenesis.[2] The association of cholesterol with depression stems from the epidemiological studies that lipid lowering drugs (statins) leads to higher risk of depression in a proportion of cases.[3]

Cholesterol is an important factor in the receptor sites of the cells binding with the appropriate neurotransmitter, in particular acetylcholine and serotonin. Research has suggested that cholesterol is the facilitator of the attachment between the neurotransmitter and the cell membrane, as well as their delivery to specific protein receptors.[4] Another study hypothesizes that this mechanism actually causes inhibition of neurotransmitter release due to the low levels of cholesterol.[5]

The present study aims to measure the serum total cholesterol and HDL-Cholesterol in clinically diagnosed patients with depression and study their levels in different age groups and gender.

MATERIALS AND METHODS

The present study comprised of 50 cases of depression and 50 age and sex matched healthy controls visiting the Department of Psychiatry, Assam Medical College, Dibrugarh, Assam.

Inclusion Criteria: Patients of age group 16 to 50 years, newly diagnosed cases of depression as diagnosed by DSM IV and previously diagnosed cases of depression in which patient is

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drug free for atleast one month.

Exclusion Criteria: Patients with other associated psychiatric disorders and dementia, Substance abuse, systemic illness like diabetes, hypertension, hypothyroidism, renal disease, liver disease, obesity and cancer, pregnant ladies and lactating mothers, patients on multivitamins and oral contraceptive pills (OCP) and patients with mental retardation and hearing impairment

The Grading of the cases included in the present study into mild/ moderate/severe was done using the 17 item Hamilton Depression Rating Scale.

SERUM CHOLESTEROL ESTIMATION: (CHOD/PAP METHOD).[6,7,8]

Principle: Cholesterol esterase (CHE) hydrolyses cholesterol ester to free cholesterol. Free cholesterol is oxidized to hydrogen peroxide. Hydrogen peroxide formed reacts with 4-amino antipyrine and phenol in the presence of peroxidase (POD) to produce red coloured quinoneimine dye complex. Intensity of the colour formed is directly proportional to the amount of cholesterol present in the sample.

$$\text{Cholesterol esters} + H_2O \xrightarrow{\text{chol. esterase}} \text{Cholesterol} + \text{Fatty acids}$$

$$\text{Cholesterol} + O_2 \xrightarrow{\text{chol. oxidase}} \text{Cholestenone} + H_2O_2$$

$$H_2O_2 + \text{4Aminoantipyrine} + \text{Phenol} \xrightarrow{\text{peroxidase}} \text{Red quinoneimine dye} + H_2O$$

HDL CHOLESTEROL ESTIMATION (PEG/ CHOD-PAP METHOD).[6,7,8,9,10]

Principle: Chylomicrons, VLDL and LDL were precipitated by adding precipitating reagent containing polyethylene glycol to the sample. Centrifugation of the precipitant leaves only the HDL in the supernatant (centrifugation done at 2500-3000 rpm). The supernatant was separated out and its cholesterol content was determined using the cholesterol reagent.

Apart from unpaired student's test, ANOVA, Regression Analysis were the statistical tools applied.

RESULTS

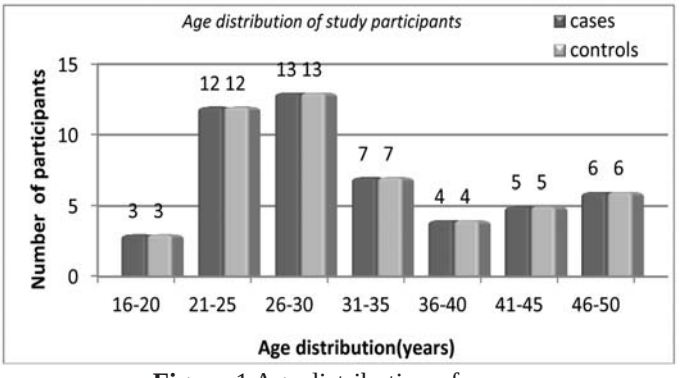

Figure 1 Age distribution of cases

The diagram shows that highest number of depression cases included in the study were in the 26-30 years age group (26%), followed by 21-25 years age group (24%).16-20 years age group with only 3 cases showed the lowest number of cases i.e., 6%.

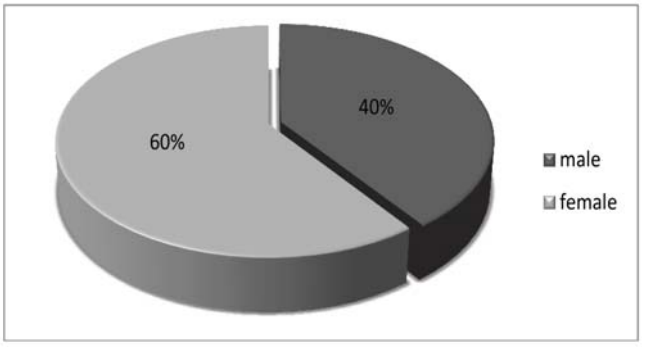

Figure 2 Gender distributions of cases

The diagram shows that majority of the cases in the present study were females. 40% of cases were males and 60% of the cases were females with a male female ratio of 0.67:1.

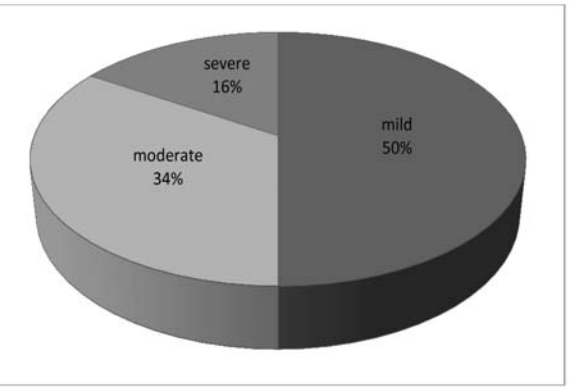

Figure 3 Different grades of depression

In the diagram, it is seen that mild depression constitutes the majority of the cases under study.25 cases (50%) of total cases were mild depression, 17 cases (34%) were moderate depression and 8 cases (16%) were severe depression.

Table1 Comparison in cases and controls

	CASES(mg/dl)		CONTROLS(mg/dl)		
Parameters	Mean	S.D	Mean	S.D	P-value
Total cholesterol	149.57	27.75	162.54	25.05	<0.05*
HDL-C	42.15	8.83	45.33	5.06	<0.05*

***= Statistically significant**

Serum cholesterol in cases (149±27.75mg/dl) was significantly lower ($p<0.05$) than in the controls (162.54±25.05mg/dl). Serum HDL in cases (42.15±8.83mg/dl) was also significantly lower ($p<0.05$) than in the controls (45.33±5.06mg/dl).

Table 2 Comparison in male and female cases

		Cases		Controls		
Parameters		Mean	S.D	Mean	S.D	P-value
TC (mg/dl)	Male	149.0	25.89	171.20	26.26	NS
	Female	149.96	29.35	156.76	22.86	NS
HDL(mg/dl)	Male	39.44	6.67	45.91	4.80	<0.01*
	Female	43.95	9.71	44.95	5.27	NS

***= Statistically significant; NS= Not Significant(p>0.05)**

From the above table, it is observed that both the parameters in male and female cases were respectively lower than in the male and female controls. However, serum HDL (39.44±6.67vs.45.91±4.80 mg/dl) in the males was statistically significant (p<0.01).

Table 3 Comparison on basis of different grades of depression in cases and controls

		MILD	MODERATE	SEVERE
		Mean ±SD	Mean ±SD	Mean ±SD
TC(mg/dl)	Case	169.31±18.97	135.91±15.13	116.93±23.42
	Control	162.9±24.97	165.67±26.25	154.76±24.22
	p-value	NS	<0.0001*	<0.01*
HDL(mg/dl)	Case	42.93±7.02	43.24±10.43	37.38±9.89
	Control	49.71±4.96	46.07±5.53	45.73±4.70
	p-value	NS	NS	<0.05*

***= Statistically significant; NS= Not significant**

In the table, it is observed that in mild depression cases, serum cholesterol was higher in the cases compared to the controls, but in cases of moderate and severe depression, total cholesterol and HDL-cholesterol were lower in cases than in controls**.**

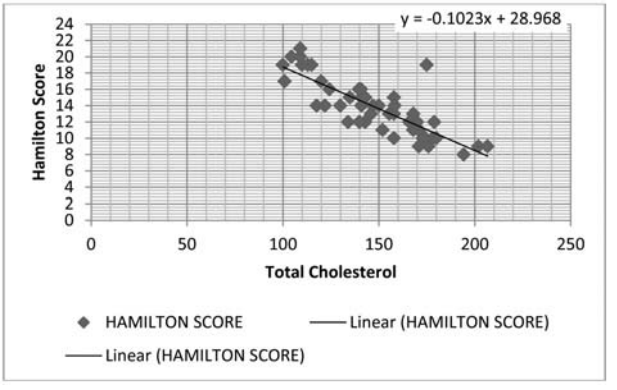

Figure 4 Correlation of total cholesterol and Hamilton score correlation in cases

Regression analysis revealed that a = 28.96 and b= -0.102

Now, the equation becomes,

Hamilton score =28.96 - 0.102×serum cholesterol

Thus, the Hamilton score can be calculated from the serum total cholesterol level.

DISCUSSION

Anita B. Kale et al[11] in an Indian study found significantly low serum lipid levels in the study group as compared to the control group.Our study was also in agreement with findings of BN Patra et al[12] and Marko Martinac et al[13] with regard to serum total cholesterol. Verma et al in an Indian study in suicide attempters found total serum cholesterol, serum Triglyceride, LDL levels and HDL-cholesterol to be lower in suicide attempters but were not statistically significant[14]. Lower HDL-Cholesterol was also observed by Kale AB, Kale BS, Chalak SS, TaTankhiwale SR, Bang G, Agrawal M, et al.[11]

When analysed gender wise serum total cholesterol was found to be lower in the depressed study participants than in the healthy controls in both the genders, and different age groups; but results were not statistically significant.

When analysed according to severity of depression, lowest value of total serum cholesterol was found in the severe depression cases. Statistically significant difference was seen on comparing the mild and the moderate (p<0.001), and mild and the severe (p<0.001). However, there was no statistically significant difference between the moderate and the severe group(p>0.05).

The above finding was consistent with a metaanalysis which found that higher TC was associated with lower levels of depression, and this association was substantially larger among medication-free samples.[15]

On gender wise analysis, serum HDL was found to be lower in the depressed study participants than in the healthy controls in both the genders, and it was statistically significant in the males (p<0.01).When analysed in the different age groups, serum HDL was found to be lower in the cases than in the controls of all ages but the findings were not statistically significant.

When we analysed HDL-cholesterol according to severity of depression, lowest value was found in the severe depression cases.However, the difference in the mean values of serum HDL was not statistically significant (p>0.05).

Low cholesterol in depression may be explained by the cholesterol serotonin hypothesis. This hypothesis states that reduction of serum TC may decrease brain cell membrane cholesterol and thereby lowering microviscosity of the cell membrane and subsequently decreasing the exposure of protein serotonin receptor on the membrane surface resulting in poorer uptake of serotonin from blood and less serotonin into brain cells leading to depression.[16]

Penttinen J suggested another possible mechanism that interleukin-2 lowers cholesterol and increases triglycerides and also suppresses melatonin secretion, thus causing depression and suicidal tendencies.[17]

Low serum HDL in depression was consistent with the findings of Maes et al. It was suggested that (i) lower serum HDL-C levels are a marker for major depression and suicidal behaviour in depressed men, (ii) lower serum HDL-C levels are probably

induced by the immune/inflammatory response in depression and (iii) there is impairment of reverse cholesterol transport from the body tissues to the liver.[18]

Grading of depression cases was done using the Hamilton Scale which is a purely subjective scale, so there might be overlapping of symptoms and it is also difficult to differentiate borderline cases. This may be a cause for non significant results in the moderate vs. severe group comparison.

CONCLUSION

From the present study, it was observed that total cholesterol and HDL-cholesterol was significantly lower in patients with depression patients as compared to age and sex matched healthy controls. In addition, serum total cholesterol concentration showed a declining trend as the disease progressed from mild to severe. Individuals with low levels of cholesterol could be screened for depression so that corrective measures are taken at the earliest to prevent deaths from suicides. It could be further argued that serum total cholesterol may serve as a prognostic marker for disease conversion from mild to severe which would go a long way in decreasing the social burden of thedisease.However. a larger sample size, longer duration of study and inclusion of drug-naïve cases could have helped in conclusively settling the debate on the stellar role of cholesterol in depression.

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Conflict of Interest:"No conflict of interest associated with this work".

Ethical Clearance: Ethical clearance was obtained from the Institutional Ethics Committee.

Source of Funding: Department of Biotechnology

Contribution of Authors: I (We) declare that this work was done by the author(s) named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. The study was conceived, designed by Dr. Jahnabi Barua along with data collection. Statistical analysis was carried out by Dr. Jahnabi Baruah and Dr. Pratim Gupta.

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A Clinical Study on Lichtenstein Inguinal Hernioplasty Using Prosthetic Mesh

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ABSTRACT

***Introduction**: Inguinal hernia is one of the commonest problems requiring surgical intervention. Surgeons all over the world have tried to perfect the ultimate hernioplasty in recent times for which various techniques and variations have been undertaken so that a mind stretching variety of operations are available to deal with the problem of inguinal hernia. **Aims and objectives**: The aim of the study was to study the Lichtenstein prosthetic mesh tension free repair with respect to technique pitfalls and also the clinical presentation with respect to symptoms and signs and the indications and contraindications for the procedure. **Materials and Methods**: A total 56 hernia repairs of 52 patients performed in a tertiary care centre during a period of one year were studied. **Result**: All the patients were male with a mean age of 48.86 years and maximum (26.9%) belongs to the age group of 36–45 years. The overall complication encountered is 12.5% in all the 56 repairs. All repairs showed excellent results from the 3rd and subsequent follow ups. There were no major complications during and after the repair. **Conclusion:** Thus, the tension free inguinal hernioplasty using a prosthetic mesh can confidently performed for all adult inguinal hernia to provide the benefits of less morbidity and excellent results to the patients. The surgeon should also avail the benefit of the simplicity of the procedure providing such excellent results.*

***Keywords:** Inguinal hernia, hernioplasty, prosthetic mesh patch, recurrence, tension free repair*

INTRODUCTION

Inguinal hernia is one of the commonest problems requiring surgical intervention. This variant of hernia is more common in the males of our species. Twenty five percent of males and two percent of females will develop inguinal hernias in their lifetimes. Despite the frequency of surgical repair, perfect results continue to elude surgeons and the rate of surgical failure in humbling. To overcome this, the surgical management of hernia has undergone extensive re-evaluation since the time of Celsus in the 1st century A.D. With the passage of time, surgeons all over the world have tried to perfect the Ultimate hernioplasty in recent times. Various techniques and variations have been under taken by surgeons in various centers so that a mind stretching variety of operations are available to the current day surgeons to deal with the problem of inguinal hernia.

However, the overall results of hernia repair are far from satisfactory with a high recurrence rate. The basic cause of this unacceptable situation is faulty technique on part of the surgeons leading to incomplete dissection and repair under tension. Tissues under tension have their blood circulation impaired with resultant ischemic necrosis. The tissue is thus weakened and recurrence occurs. The various methods of repair of hernia have their own pitfalls. However one aspect of hernia repair is agreed upon by all, that is the repair must not end in a recurrence and to avoid this ultimate failure, the consensus is to do a repair which is physiologically correct and without approximating tissue forcefully. Thus the surgeons have sought the ideal tensionless repair. Recognizing the lack in logic in repairing a hernia by placing together attenuated tissues under tension, Lichtenstein LL and colleagues demonstrated a tension free hernioplasty performed with a prosthetic mesh patch reinforcement sutured to the margins of defect with no attempt at forceful approximation.[1]

Lichlenstein LL et al continued their earlier report on using prosthetic mesh for hernioplasty in 1000 consecutive cases

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without recurrences.[2] Davies N et al observed that the tension free repair of inguinal hernia with a prosthetic mesh developed at the Lichtenstera Hernia Institute is reportedly less painful, allows rapid return to activity and carryind allow incidence of recurrence.[3] Gianetta et al reported no perioperative mortality and no recurrence.[4] Kark et al reported no recurrence in a 18 month to 5 year follow up of the primary inguinal hernia repairs using Lichtenstein patch repair.[5]

Recognizing that inguinal hernia repair is full of pitfalls, and keeping in view the opinions in favour of the tension free method, the present study was undertaken on the Lichtenstein method of hernia repair using prosthetic mesh patch. The aim of the study was to study the Lichtenstein prosthetic mesh tension free repair with respect to technique pitfalls and also the clinical presentation with respect to symptoms and signs and the indications/ contraindications for the procedure.

MATERIALS AND METHOD

This study was undertaken in the six general surgical wards of Gauhati Medical College and Hospital, Guwahati, Assam for a period of one year. All the patients of age more than 25 years of age admitted in the surgical wards for hernia repair were included in the study. Of the total admission in the surgical wards, 158 inguinal hernia cases were examined and 52 cases of primary or recurrent inguinal hernia were selected for the study based on the inclusion and exclusion criteria. Patients under 25 years of age/ NYHUS type l, patients with presence of obstruction/ strangulation /acuter admissions or with life threatening concomitant diseases, patient with associated femoral hernia, hydrocele or undescended tested were excluded from the study.

RESULTS AND OBSERVATION

The age of patients in the present study ranged from 26 to 78 years and the median age was 50 years and the mean age was 48.86 years. All the patients (i.e., 100%) were males. Maximum of the patients (26.9%) were of the age group of 36 – 45 years.

The hernias were right sided in 22 patients, left sided in 26 patients and bilateral in 4 patients. The commonest symptom was a swelling in the groin and it was complained of by all patients (**Table 1**).

Table 1 Side of Hernia and presenting complaints of the patients during admission

	No. of Patients (n= 52)	Percentage
Affected Side of Hernia		
Right	22	42.3
Left	26	50.0
Bilateral	4	7.7
Complaints		
Swelling in the groin	52	100
Mild to moderate pain	18	34.6
Irreducibility	12	21.4

The duration of swellings ranged from 2 to 30 months with a mean duration of 10.96 months and median of 9 months. On examination, the extent of the swelling varied as shown in **Table 2**.

Table 2 Duration and extent of swelling

	Number of Hernias (n=56)	Percentage
Duration of Swelling (in months)		
1- 10	30	53.6
11- 20	22	39.3
21 - 30	4	7.1
Extent of Swelling		
Bubunoccle	12	21.43
Funicular	18	32.14
Scrotal	26	46.43
Hernias with Contents		
Intestine	31	55.36
Omentum	17	30.36
Intestine + Omenturn	8	14.28

A total of 31 (55.36%) hernias were found to contain intestine, 30.36% contained omentum and 14.28% were suspected of containing both intestine and omentum. The Deep ring occlusion test was positive for occlusion in 26 hernias, negative 21 hernias and not applicable on account of irreducibility in 9 hernias **(Table 3).**

Table 3 Hernias with contents and results of deep ring occlusion test

	Number of Hernias (n=56)	Percentage
Hernias with Contents		
Intestine	31	55.36
Omentum	17	30.36
Intestine + Omenturn	8	14.28
Deep Ring Occlusion Test		
Positive	26	46.4
Negative	21	37.5
Not Applicable	9	16.1

A total of 45 of the patients were operated under spinal anaesthesia and 7 patients were operated under general anaesthesia. All the four bilateral cases were operated under general anaesthesia. The operative findings showed that there were 31(55.36%) indirect, 17 (30.36%) direct and 8 (14.29%) combined hernias. These observations were in variance with the observations on clinical examination **(Table 4).**

Table 4 Clinical and operative findings of the different hernias

Clinical Findings	No. of hernia	%	Operative Findings	No. of hernia	%
Indirect	26	46.4	Indirect	31	55.36
Direct	21	37.5	Direct	17	30.36
Ambigous	9	16.1	Combined	8	14.29

The NYHUS classification was done to assess the posterior wall defects and it yielded that majority (42.85%) of the hernias were of type IIIB. Suction drain was used in 26 out of 56 hernia repairs i.e., 46.4% of repairs. The operating time after induction of anaesthesia ranged from 25 to 74 minutes with a mean operating time of 43.62 minutes and Median of 41 minutes. The operating time was between 25-34 minutes in 30.35% of repairs followed by 28.57% in the range of 45-54 minutes and 23.21% in the 35-44 minutes range. In 17.85% cases operating time was between 55-74 minutes. Analgesic injection (Dielofenac Sodium 75 mg) requirement postoperatively was in the range of 2-4 injections with a mean of 2.46 injections. The number of analgesic tablets (Nimesulide 100mg) was in the range of 4 to 10 tablets with a mean of 7.11 tablets.

The main early postoperative complications during postoperative hospital stay was urinary retention (3.57%) followed by scrotal swelling (1.79%) (Table 5).

Table 5 Early post operative complications

Complications	Number of repairs (n=56)	Percentage
Urinary Retention	2	3.57
Scrotal Dermatitis	2	3.57
Scrotal Swelling	1	1.79
Cough	1	1.79

Scrotal dermatitis was due to skin contact with 5% Povidine Iodine during the septic and antiseptic preparation of the scrotum prior to operation. Cough developing postoperatively was similarly a non specific complaint unrelated to hernia repair. Exclusion of these 3 non specific condition resulted in 3 total early postoperative complication with a rate of 5.35%.

The post-operative hospital stay ranged from 2-5 days with a mean of 2.78 days. The return to normal activity period across the whole group ranged from 7 to 21 days with a mean of 12.96 days. In the 1st follow up (i.e., 8th post-operative day), 91.07% repairs showed excellent results. Only 5 complications were reported, of which 2 patients had pain and one each had scrotal swelling, scroma and infection. At the end of one month excellent results were obtained in 98.21% of the repairs. There was one complication in the form of pain which carried over from the 1st follow up. All repairs showed excellent results from the 3rd and subsequent follow ups. The overall complications rate in the follow up was 8.92%. On including the early post operative complications, the total complication encountered in this series tension free repair was 12.5%. No recurrence was noted during the period of follow up.

DISCUSSION

The age of the patients in the present study ranged from 26 to 78 years with a median age of 50 years, which is in accordance with the findings of Amid et al.[6] In the present study inguinal hernia was more common in males (100%). The male preponderance is similar to the findings of Capozzi et al[7], Amid et al[6] and Wantz[8]. The major complaint complained of by the patients was swelling in the groin (100%). 32.14% of the patients complained of mild pain in the groin area. These two symptoms were the most frequent complaints encountered in the present study.

In the present series, most of the patients (92.3%) had unilateral hernia. Davies et al[3], Capozzi et al[7] and Kark et al[5] also reported similar findings in their studies. In the present study, out of the total 56 hernias, majorities (55.36%) were indirect inguinal hernias followed by direct hernias (30.36%) and combined hernias (14.29%). These findings corroborates with the findings of Capozzi et al[7], Amid et al[9], Wantz[8], Prywinski et al[10] and Kark et al.[5]

In the present series of repairs operations were done under spinal or general anaesthesia and incision extended as and when required. Indirect sacs were dissected out, excised and transfixation ligature applied. Direct sacs, if large were inverted by a purse string suture. Next a Prolene (polypropylene) mesh of 5 inch x 3 inch size was trimmed and sutured the edges of the canal floor without tension. A slit in the lateral end of the mesh allowed the emergence of the spermatic cord. A suction drain was given in some cases where deemed necessary. The external oblique aponeurosis and skin were closed in layers. Similar procedure was also reported by the other authors in their studies.

Amid et al[11] reported using a 8x16 cms precut mesh trimmed by 102 cms resulting in 6x8 cms wide patch. We have used a 3x5 inch i.e. 7.5x12.5 cms prolene mesh suitably trimmed to around 6x8 cms to overlap the inguinal floor on all sides. Shulman et al[12] reported placing the mesh between the two oblique muscles and recommended it for tension free hernioplasties. Amid et al[6] stressed on the need to overlap the mesh at the pubic bone and employing a wide patch of mesh to provide an appropriate degree of laxity. Similar to the findings of the present study, Amid et al[13] also reported the use of suction drain. Though the suction drain increased post operative hospital stay, it is useful in preventing post operative hematoma and subsequent infection.

The operating time, after the induction of anaesthesia, in the present series ranged from 25 minutes to 74 minutes with a mean operating time of 43.62 minutes which varied with the findings of the other literatures. The post operative analgesic requirements in the present series were a median of 2 injections of Diclogenac Sodium 75 mg and 6 tables of Nimesulide tablets 100mg. Davies et al[3], Amid et al[6] and Kark et al[5] also reported the need of analgesic in their studies.

The present study revealed that the return to normal activity across the whole group ranged from 7 to 21 days with a mean of 12.96 days and a median of 12 days, which is in accordance with the findings of Amid et al[11], Davies et al[3] and Kark et al.[5, 14]

In the present series there were a total of 7 complications, all minor, in 56 Lichtenstein tension free repairs. There was 1(1.79%) case of scrotal swelling in the early post operative period. There were also 2 (3.57%) cases of urinary retention in the early post operative period. There was one seroma (1.79%) which resolved spontaneously on conservative treatment. One case of infection represent as a stitch abscess. Two cases of prolonged pain subsided on conservative treatment and there was no residual neuralgia. There were no recurrences, no testicular atrophy or chronic residual neuralgia, no mesh rejection or frank infection

requiring mesh removal. All cases showed excellent results at the end of the follow up period. These findings corroborate with the findings of Davies el al[3], Kark et al[5, 14], Amid et al[6], Velitchkov et a1[15], Wantz[8] and Prywinski.[10]

There were no major complications like chronic residual neuralgia, testicular atrophy, frank infection, mesh rejection and there was no recurrence. Thus, the procedure was well tolerated, highly safe and highly effective with no failures as evaluated in the present series.

CONCLUSION

Inguinal hernia is more common in the males of our species and affects the young and old alike. The inguinal hernias in the adult patients are repaired by various methods of sapphires and plastics. However one aspect of hernia repair is agreed upon by all, that is the repair must not end in a recurrence and to avoid this ultimate failure, the consensus is to do a repair which is physiologically correct and without approximating tissue forcefully.

Thus, the tension free inguinal hernioplasty using a prosthetic mesh as outlined by Lichtenstein can confidently performed for all adult inguinal hernia to provide the benefits of less morbidity and excellent results to the patients. The surgeon should also avail the benefit of the simplicity of the procedure providing such excellent results.

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Prevalence of Hypertension Among the Patients Attending the Dental Out-Patient Department

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ABSTRACT

***Objective**: To determine the prevalence of hypertension among the patients attending dental out-patient department. **Introduction**: Many patients seeking dental treatment and attending in Dental Clinic may not be healthy and may come with physical ailments like hypertension which may restrict his desired Dental procedures. Dentist may not be able to provide the treatment to prevent any untoward accident. **Material and methods**: The present study was a hospital based cross sectional study conducted in a tertiary care centre during the period of January 2017 to March 2017. **Result**: Analysis was done upon 98 dental outdoor patients to determine the prevalence of hypertension. The overall prevalence of hypertension was found to be 52% among the study group. **Conclusion**: Before going for any dental procedure especially in elderly patients, a through clinical examination may lead to improved monitoring and treatment to the patients and it helps the doctor to avoid any untoward incident.*

***Keywords:** Elderly patient, dental procedure, clinical examination, **JNC-7** guidelines*

INTRODUCTION

Hypertension is one of the cardiovascular diseases which has been reported as one of the common causes of death.[1,2] Hypertension can be diagnosed by measuring a patient's blood pressure and once detected, treatment methods have to be initiated to reduce the risk of cardio vascular diseases and fatality to a reasonable level[3] to avoid any untoward incident.

Many patients do not routinely measure their own blood pressure, some may remain unnoticed and some patients may have irregular control of blood pressure. Some of patient does not know that he / she is hypertensive. The prevalence of hypertension in population has been reported different geographically since it may be influenced by environmental factors.

This study became necessary because of increasing number of hypertensive patients detected at the dental clinic. The objective was to determine the prevalence of hypertensive patients among dental patients.

MATERIALS AND METHOD

The present study was a hospital based cross sectional study conducted in a tertiary care centre of Assam during the period of January 2017 to March 2017. A total of 98 patients attending the dental out-patient department during the study period and satisfying the inclusion and exclusion criteria were included in the study. Patients of both the sexes of age group 25- 65 years were included in the study. However, pregnant women, patients suffering from heart diseases and other chronic diseases were excluded from the study.

Measurements of the Blood Pressure of all the participants were taken using Sphygmomanometer and Stethoscope. Blood pressure of each patient was re-checked after 10 minutes. Study participants were categorized into two groups: First, those diagnosed with hypertension previously; i.e., those who reported being diagnosed hypertensive and/or were taking antihypertensive drugs during the visit. Second group consisted of those who were undiagnosed, but elevated blood pressure

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reading, at the initial screening (systolic >140 mm Hg and/or diastolic >90 mm Hg). They were referred to the general physicians for further diagnosis and treatment. Levels of blood pressure of the patients were classified as per the JNC 7 criteria.[4] Data were presented in terms of percentages and statistical analyses were performed using Fisher's exact test.

RESULT AND OBSERVATION

In the present study, out of 98 patients, males (62.2%) were more than females (37.8%). Maximum of the patients (32.6%) were in the age group of 30- 39 years of age followed by 31.6% in the 40-49 years age group (**Table 1**). Mean age of the patients was 42.7 years with a standard deviation of 10.5 years.

Table 1 Age and Sex Distribution of the Study Participants

Age Group (in years)	Number of participants		Total
	Male (%)	Female (%)	
< 30	7 (77.8)	2 (22.2)	9 (9.2)
30 – 39	19 (59.4)	13 (40.6)	32 (32.6)
40 – 49	20 (64.5)	11 (35.5)	31 (31.6)
50 – 59	10 (55.6)	8 (44.4)	18 (18.4)
60 and above	5 (62.5)	3 (37.5)	8 (8.2)
Total	61 (62.2)	37 (37.8)	98 (100)

Figures in the parentheses are the percentages

Out of the 98 patients studied, 40 (40.8%) were in Stage-I hypertension and 11 (11.2%) were in stage-II hypertension as per JNC7. Male hypertensive patients (35, 57.4%) were more than the females (16, 43.2%). (**Table 2**)

Table 2 Levels of Blood Pressure of the Participants as per JNC7

Levels of Blood Pressure as per JNC7	Sex		Total
	Male	Female	
Normal	3 (37.5)	5 (62.5)	8 (8.2)
Pre-Hypertension	23 (59.0)	16 (41.0)	39 (39.8)
Stage-I Hypertension	30 (75.0)	10 (25.0)	40 (40.8)
Stage-II Hypertension	5 (45.5)	6 (54.5)	11 (11.2)
Total	61 (62.2)	37 (37.8)	98 (100.0)

Figures in the parentheses are the percentages

When the initial screening was done, 19 patients were found to have previously diagnosed as hypertensive whereas 32 previously undiagnosed patients were found as hypertensive (**Table 3**). All those 32 patients were referred to the general physician for further diagnosis and treatment. All the 32 patients were returned with a final diagnosis of hypertension. Thus, the overall prevalence of hypertension was found to be 52% (51/98) among the study group.

Table 3 Distribution of the Hypertensive Participants as per their Diagnosis status

Diagnosis Status	No. of Participants	Percentage
Previously Diagnosed	19	37.3
Previously Un-Diagnosed	32	62.7
Total	51	100.0

The age-wise prevalence of hypertension showed that maximum (33.3%) of the hypertensive patients were in the age group of 40-49 years followed by the age group of 50-59 years (29.4%). At the same time the proportion of previously undiagnosed patients were found to be increasing with the increase of age (**Table 4**).

Table 4 Age-wise Distribution of the Hypertensive Participants as per their Diagnosis status

Age Group (in years)	Diagnosis Status		Total
	Previously Diagnosed	Previously Un-Diagnosed	
< 30	3 (60.0)	2 (40.0)	5 (9.8)
30 – 39	3 (42.9)	4 (57.1)	7 (13.7)
40 – 49	7 (41.2)	10 (58.8)	17 (33.3)
50 – 59	5 (33.3)	10 (66.7)	15 (29.4)
60 and above	1 (14.3)	6 (85.7)	7 (13.7)
Total	19 (37.3)	32 (62.7)	51 (100)

Figures in the parentheses are the percentages

The different levels of blood pressure as per JNC7 classification with respect to the age of the participants were shown in **Table 5**. A significant association was observed between the different levels of blood pressure and age group of the participants ($p < 0.01$).

Table 5 Levels of Blood Pressure (JNC 7) of the Participants according to Age

Age Group (in years)	Levels of Blood Pressure as per JNC 7				Total
	Normal	Pre-Hypertension	Stage-I Hypertension	Stage-II Hypertension	
< 30	1 (11.1)	3 (33.3)	5 (55.6)	0 (0)	9
30 – 39	4 (12.5)	21 (65.6)	7 (21.9)	0 (0)	32
40 – 49	3 (9.7)	11 (35.5)	13 (41.9)	4 (12.9)	31
50 – 59	0 (0)	3 (16.7)	10 (55.6)	5 (27.8)	18
60 and above	0 (0)	1 (12.5)	5 (62.5)	2 (25.0)	8
Total	8 (8.2)	39 (39.8)	40 (40.8)	11 (11.2)	98

DISCUSSION

Hypertension is the most common problem among elderly people as well as middle aged people. The mean age of the patients of 42.7 years of this study was supported by Kearney PM.[5] In this study males (62.2%) were more than females (37.8%), which was consistent with the findings of Sikkerimath SB.[6] The overall prevalence of hypertension of this present study was 52% (51/98). This high prevalence of hypertension was supported by European hypertension which occurs in about 30-45% of people as of 2013[7] and the United States which has the prevalence of 24% of adult population.[8, 9] As of 2006 hypertension affects 76 million US adults (34% of the population) and African American adults have among the highest rates of hypertension in the world at 44%[7] similar to this study. This high prevalence is in accordance with several Indian studies mentioned in National Cardiovascular Disease Database.[10]

Hypertension is more common in men (though menopause tends to decrease this difference),[11] which was supported by the findings of the present study. The higher proportion of hypertension in males compared to the females revealed in the present study was in accordance with the findings of Sikkerimath SB.[6] High blood pressure affects between 16 and 37% of the population globally[12] supporting this study.

CONCLUSION

The present study showed a high proportion of hypertensive patients, both diagnosed and undiagnosed, were visiting the dental out-patient department for seeking dental treatment. Based on the evidences presented in this study, dentists should give emphasis on the detection and referral of patients suffering from high blood pressure. Therefore, before going for any dental

procedure especially in elderly patients, a through clinical examination may lead to improved monitoring and treatment to the patients.

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Declaration: Considerable contributions to conception and design

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CASE REPORT

Rupture of Unscarred Uterus in a Nulliparous in Unestablished Labour

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***Received** on April 4, 2016; **editorial approval** on January 30, 2017*

ABSTRACT

This is a case report on a patient who experienced uterine rupture in her first pregnancy while not in established labour. No associated risk factors were found. Aims: To highlight course of events and promote critical thinking around the challenge of management in future pregnancies. Methods: Data was obtained directly from the medical notes. Result: Good maternal and fetal outcome was achieved following uterine rupture. Future pregnancy will have multidisciplinary planning. Various options were discussed with the couple, one of which is to manage her as an in-patient from 34weeks gestation with an elective LSCS planned at 36weeks. Discussion: There are numerous established risk factors associated with a ruptured uterus however only few causes are explained the unscarred uterine rupture in unestablished labour. Radiological investigation may be useful provided mother and fetus remain stable. If surgical repair is not suitable, it is reasonable to proceed for a hysterectomy instead of uterine repair. It remains crucial for the patient to be investigated fully when other causes are suspected e.g. connective tissue disorder. Conclusion: With the aid of a multi-disciplinary team and systematic approach, high standard of care can be provided even to the most challenging cases.

***Keywords:** Uterine rupture, Ehlers-Danlos-Syndrome*

INTRODUCTION

Uterine rupture is an extreme life threatening obstetric emergency associated with maternal and fetal morbidity and mortality. Uterine rupture in the absence of previous scar has an estimated incidence of 1 in 5,700 to 1 in 20,000.[1]

The identifiable causes of ruptured uterus include previous surgery, physical trauma, multiparty, prolonged labour, augmentation or induction of labour, collagen disorders of collagen and structural uterine abnormalities.

The woman we report was a low risk with uterine rupture in an unscarred and non-labouring uterus at term which is extremely rare. Although there was good maternal and fetal outcome in this case as she was managed in a timely manner after she was brought to hospital, this could have had a different outcome if she had not arrived on time. The management of her future pregnancy remains a sizable challenge for clinicians.

CASE HISTORY

We report the case of a 23 years old Caucasian nulliparous with an uneventful antenatal course. Her past history comprised of her knees locking and clicking during movement without joints swelling or dislocations at the age of 12. This was investigated without definitive diagnosis.

She presented to us via ambulance reporting lower abdominal pain for 2 hours prior to admission. The pain was sudden onset while trying to open her bowels and was continuously getting worse. On clinical examination her blood pressure was 120/78mmHg with a pulse of 126 beats/minute (bpm), respiratory rate of 18 and oxygen saturation of 100%. Her haemoglobin was 111gms/L, WCC 27.0 x 10 9/L and platelets 199 x 109/L. On abdominal palpation uterus was soft, tender but relaxed in

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between tightenings with 3/5th palpable cephalic presentation. On auscultation fetal heart was 90 bpm and Cardiotocography (CTG) was commenced. Vaginal examination revealed that cervical os was 1 cm dilated, with presenting part at station -3. Membranes were artificially ruptured (ARM) and slight blood stained liquor was noticed. A category 1 emergency caesarean section (EMCS) was performed due to fetal bradycardia with the working diagnosis of placental abruption. Moderate amount of hemoperitoneum was noted intraoperatively. A live baby weighing 3160 gms was delivered with APGAR scores of 2, 6 and 6 at 1, 5 and 10 minutes respectively. The cord gases were arterial pH 7.00 with base excess (BE) of -15 and venous pH 6.97 with BE -15. Placenta appeared normal and complete without evidence of abruption. On exploration, a left sided vertical laceration was noted on the posterior aspect of the uterus, involving the entire thickness arising from left tubal insertion till the proximal part of vagina. This rupture was located 3-4 cms medial to the left ovarian vessels. A diagnosis of a spontaneous rupture of uterus in an unscarred uterus was made. Both the EMCS incision and uterine wall rupture were individually repaired with vicryl, flowseal applied to the area of rupture and drain was left in-situ. Her total blood loss during the EMCS was 1700mls. The patient was discharged 4 days later and was seen at 6 weeks follow up to discuss about risks in future pregnancy, timing and mode of delivery.

In view of the rupture of unscarred uterus without labour and history of easy dislocation of her knees, the possibility of Ehlers-Danlos-Syndrome or other connective tissue disorder was considered and she was referred to the rheumatologist for further investigations postnatally. After clinical assessment of joint mobility by Brighton scoring (a score of four or more suggests likelihood of joint hypermobility)[2] she was further referred to the National Diagnostic Centre for Ehlers-Danlos. She was tested for Vascular Ehlers-Danlos-Syndrome (COL3A1 gene mutation) and no abnormalities were found.

DISCUSSION

Uterine rupture is defined as a full thickness tear through the myometrium and serosa with or without expulsion of the fetus from the uterine cavity.

The overall incidence of uterine rupture is 0.05 to 0.086% of all pregnancies.[3] Rupture of a scarred uterus is more common with the overall risk of 0.9% to 1% in a woman attempting vaginal birth after caesarean section (VABC).[4] Incidence of rupture in a previous classical section increases dramatically to 3-6% and 12% if VBAC is attempted.[5] Taylor et al showed in a multicentre study that the risk of rupture in previous LSCS attempting VBAC was higher when induced with vaginal prostaglandins (10.3% vs. 1.1%).[6] The incidence of uterine rupture in women with unscarred uterus undergoing augmentation is extremely low. Cahill analysed a consecutive series of 30874 term primiparous deliveries over a period of 13 years, of which 45% received oxytocin for augmentation without a single case of uterine rupture thus reassuring about the safety of use of oxytocin in primips.[7] A large cross-sectional study indicated that the prevalence in women with unscarred uterus is less than 1 in 10,000.[8] Most of these studies include women who have one of the risk factors; either in labour, on oxytocin or being induced using prostaglandins for obstetric indications.

This serious obstetric complication is particularly higher in developing countries as compared to developed countries.[9] Gaym and Udoma et al reported large numbers of uterine rupture cases as a result of obstructed labour over a 9 year period in Ethiopia (25%) and Nigeria (19%).[10,11]

Over the past few years, the number of both rupture of scarred and unscarred uterus has been observed to be increasing.[12] The presence of contributory factors in a woman with unscarred uterus such as multiple gestation, uterine congenital abnormality, abnormal placentation, drug use, prolonged labour, and even judicious use of oxytocin in labour, mid cavity forceps, internal podalic version may compound the risk of this potentially life threatening obstetric complication.

Due to the urgency of situation and the possibility of fetal loss, time consuming diagnostic tools and imaging facilities have extremely limited use. Assessment of clinical signs remains the gold standard for diagnosis and guides management. However even with this limitation ultrasound, CT and MRI have been used to assess high risk cases.[13]

Treatment options consist of surgical repair or hysterectomy. Surgical repair should be attempted if technically feasible where it can achieve rapid hemodynamic stability and also if there is a desire for future fertility. However the risk of future rupture is significantly higher; 6% with repeat lower segment rupture and 32% with previous upper segment rupture.[14] If uterine repair is not suitable, total or sub-total hysterectomy is the next option, depending on the extension of the tear. There is robust evidence to suggest that sub-total hysterectomy is associated with less operating time, shorter hospital stay and lower morbidity and mortality as compared to surgical repair in selected cases.[15]

Ehler Danlos Syndrome is a heterogenous collection of rare disorders of the connective tissue. The prevalence has been recently estimated to be 1 in 5000.[16] This rarity makes it difficult to estimate the true incidence of complications which include pelvic instability, complicated perineal wounds, rupture of vessels/bowels/uterus and floppy infant syndrome. The more severe complications have been reported in Type IV syndrome. On the whole pregnancy is generally well-tolerated in Type I-III with favourable maternal and fetal outcomes. Studies from Dutch Ehler Danlos Association and American Ehlers–Danlos National Foundation showed no cases of uterine rupture or any other complications.[17,18] In our case there was a high degree of suspicion of connective tissue disorder however this was ruled out after series of investigations.

A high index of suspicion is needed to make the diagnosis of ruptured uterus. A preoperative provisional diagnosis is not critical since delivery is often indicated because of abnormal fetal monitoring patterns, pain or hemodynamic instability. However symptoms may be subtle in some cases. The most common clinical sign, sudden fetal decompensation is reported in 80% cases with bradycardia.[19] The other symptoms are hyper-stimulation (40% cases), vaginal bleed and abdominal pain.

Immediate maternal collapse is rare unless the uterine tear extends into the broad ligament vessels.

In our case we discussed the challenges around her next pregnancy. Inpatient management from 34 weeks versus outpatient management was discussed. Risks of prolonged admission such as hospital acquired infection, thromboembolism and risks to baby e.g. fetal death in the event of rupture (given the additional caesarean section scar), iatrogenic prematurity; respiratory distress syndrome and prolonged SCBU stay were carefully considered. On balance it was thought the best care for future pregnancy would comprise of admission in hospital at 34 weeks, administration of steroids and elective caesarean section by 36 weeks. We agree that offering counselling and a multi-disciplinary team approach in accordance with the local trust policy is the key in managing these complex patients.

Conflict of Interest: None

Declaration of author: Patients written consent was obtained.

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42 years old lady reported to the Department of Conservative and Endodontic Dentistry, Regional Dental College, Guwahati, with mild pain in the maxillary left lateral incisor since one year. On clinical examination, grade I mobility with discoloration with missing left central incisor has been seen. Radiograph shows periapical pathology in relation to left maxillary lateral with periodontal widening with missing left central incisor .Medical and family history was non-contributory.

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CASE REPORT

An Unusual Case of Leiomyoma - Controversies in Management

Faiza Y[1], Sriemevan A[2], Pathak S[3]

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ABSTRACT

A 48-year-old nulliparous woman was referred to Gynaecology for a suspected gynaecological cancer. She presented with unexplained abdominal symptoms, iron deficiency anaemia and a large pelvic mass. Her menstrual cycle was described as heavy and regular. She had a normal cervical smear history and was in the perimenopausal stage of her life. There was no reported history of weight loss. Her past gynaecological and surgical history included a previous ovarian cystectomy and appendicetomy many years ago. There was no other significant medical or family history. On examination she had a large fibroid uterus. Ultrasound scan was suggestive of a large multi-loculated pelvic mass, but Ca125 was in the normal range. The pelvic mass was considered benign and she underwent a surgical treatment with total abdominal hysterectomy and bilateral salpingo-oophorectomy. During the surgery a distended fluid filled uterus was noted, with an appearance typical of a pregnant uterus. Histological examination confirmed a bizarre, symplastic leiomyoma of the uterus.

Keywords: *Pelvic mass, Symplastic uterine fibroids, Malignant transformation*

INTRODUCTION

Leiomyomas are common, benign smooth muscle tumours (fibroids) of the female genital tract. They are rare before the age of 20, and regress after the menopause.[1] Leiomyoma usually grows slowly, and often are asymptomatic, however, large symptomatic leiomyomas may need to be removed surgically. Malignant transformations of leiomyomas are rare and those with low mitotic activity, and lacking nuclear atypia have little or no malignant potential.[1] A bizarre, symplastic leiomyoma is a rare histological variant of a leiomyoma.[2]

This case demonstrates an unusual case of leiomyoma, and illustrates the difficulties associated with establishing a clinical and radiological diagnosis, and the consequent impact on a patient's journey from symptoms to diagnosis. It also highlights the importance of histological examination in reaching a final diagnosis of bizarre, symplastic leiomyoma.

Case Report

A 48-year-old nulliparous woman was referred to the gynaecological department for a suspected pelvic malignancy. She initially presented to her GP complaining of shortness of breath, iron deficiency anaemia and persistent unexplained abdominal symptoms. This led to a significant impact on her work, as she was experiencing difficulty in undertaking manual work related responsibilities, which resulted in her being absent from work. Her menstrual cycle was described as heavy and regular, but there was no report of intermenstrual or postcoital bleeding. She had a normal cervical smear history and was in the perimenopausal stage of her life. There was no reported history of weight loss. Her past gynaecological and surgical history included a previous ovarian cystectomy and appendicetomy many years ago. There was no other significant medical or family history. Clinical examination was suggestive of a large fibroid

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uterus/pelvic mass. An abdominal and pelvic ultrasound scan that was arranged by her GP, demonstrated a 13 cm midline complex cystic mass, (**Fig 1**).

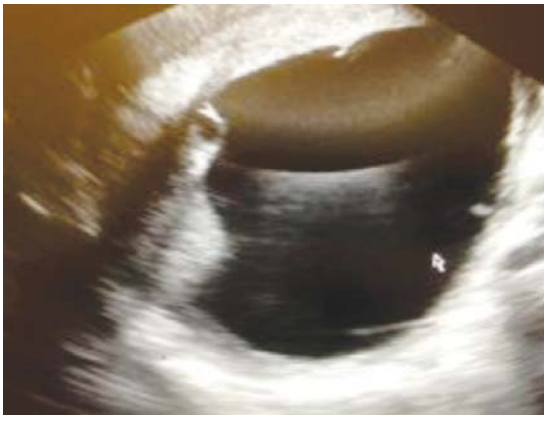

Figure 1 Ultrasound image of complex cystic pelvic mass

The origin of that complex cystic mass, (**Fig 2**) was unclear, though it was likely to be either a uterine or ovarian tumour. The endometrium appeared thickened measuring 1.5 cm in diameter. The patient was clearly very anxious with the findings as expected. A repeat ultrasound scan in the gynaecology department was suggestive of a large multi-loculated ovarian cyst, (**Fig 3**), nonetheless, a Ca125 was within the normal range.

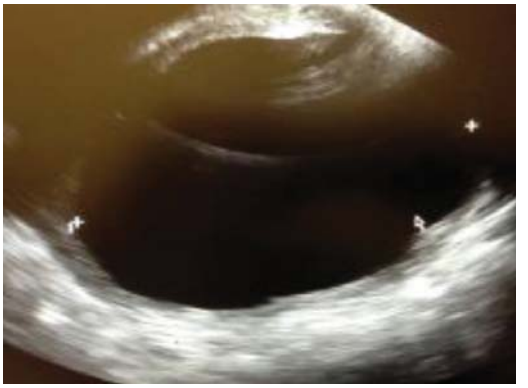

Figure 2 Ultrasound image of complex cystic pelvic mass

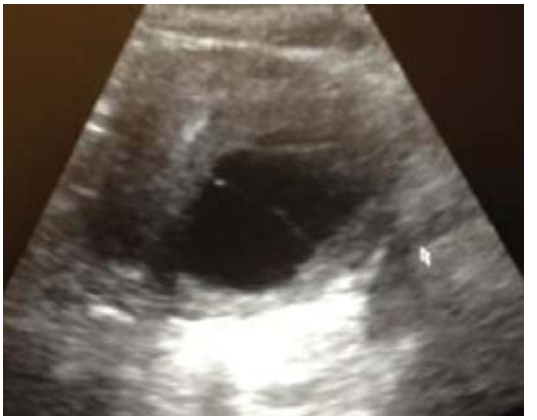

Figure 3 Ultrasound image of a multi-loculated suspected ovarian cyst

Clinically and radiologically the impression was that of a benign mass, and therefore the patient was counselled and reassured accordingly. A total abdominal hysterectomy and bilateral salpingo-oophorectomy was discussed in view of her symptoms and provisional diagnosis. Thereafter the patient sought a second opinion from her private gynaecologist who also recommended the same surgical treatment. Although the clinical examination and ultrasound scans suggested either a uterine or pelvic mass, surgery was necessary to confirm the origin of that mass, and histology was of paramount importance in reaching the final diagnosis.

The patient returned to the gynaecological department to proceed with the recommended treatment. She had an uncomplicated total abdominal hysterectomy and bilateral salpino-oophorectomy. During the surgery, a soft, distended, eighteen weeks' uterus, typical of a pregnancy was found. However, it was filled with a litre of clear fluid requiring drainage prior to hysterectomy. Following the drainage of the uterine fluid, the uterus measured approximately 11.5 cm size on gross histological examination. A small defect was noted on the serosal surface of the uterus. The endometrial cavity contained a small endometrial polyp, but there were no other lesions identified in the endometrial cavity. The endometrium was thin. There were several intra-mural yellowish – walled nodules measuring up to 1.3 cm. In the wall of the uterus was a large cystic area measuring 6 x 3 x 2 cm, but this did not communicate with the endometrial cavity. The cervix and both fallopian tubes and ovaries were normal.

Microscopically, there was no evidence of endometrial hyperplasia or malignancy. Similarly, ovaries, fallopian tubes, parametria and cervix were unremarkable. There were several unremarkable leiomyomas composed of fascicles of bland spindle cells without conspicuous mitotic activity. Sections from the cystic mass in the uterus showed highly pleomorphic spindle cells arranged into loose fascicles, but there were no signs of necrosis and mitotic activity was inconspicuous. The features were in keeping with a symplastic /bizarre leiomyoma that had undergone cystic degeneration. In some sections the atypical cells appeared to be adjacent to areas of more typical leiomyoma. The slides were sent to a tertiary centre for a second opinion and a final diagnosis confirmed bizarre, symplastic leiomyoma of the uterus.

The patient made a good post-operative recovery. The final histological diagnosis was discussed with the patient in writing and during a face-to-face consultation at 6 weeks' follow up clinic. According to multidisciplinary team no further follow up was deemed necessary.

Discussion

Smooth muscle tumors (leiomyoma) represent the most common group of uterine mesenchymal neoplasms. Although leiomyoma does not usually cause a diagnostic challenge for the clinician, yet its histological variations must be understood in order to reach a final diagnosis, and to differentiate it from its malignant counterpart, leiomyosarcoma.[3] This knowledge is clearly essential, in providing adequate patient counselling and

alleviating patient anxiety associated with the diagnosis, treatment, and follow up.

Symplastic leiomyoma is a rare histological variant of uterine leiomyoma[2] characterized by nuclear atypical tumour cells with low mitotic counts and no coagulative tumour cell necrosison microscopic examination.[4,5,6] Atypical leiomyoma is differentiated from leiomyosarcoma by a lack of necrotizing tumour cells and a mitotic count <7 per 10 high power fields. Nuclear atypia makes the difference with mitotically active leiomyoma.[7]

Although symplastic leiomyomas are benign,[8] it is more likely to undergo malignant transformation compared to uterine leiomyomas; as a result, hysterectomy is often the recommended treatment.[9] Although our patient was nulliparous, fertility was not her main priority. Also she was in the perimenopausal stage of her life. A diagnosis of symplastic leiomyomas in a younger premenopausal nulliparous woman may cause a therapeutic dilemma, particularly in those wanting a more conservative approach. Montgomery et al described 3 cases of conservative treatment where a more conservative approach was supported; two patients had hysteroscopic resection of fibroid and one had a laparoscopic myomectomy. Diagnosis of symplastic leiomyoma was made later on histological specimens. All patients were followed up with imaging but no recurrence was suspected.[10] However, the best management in women wanting to preserve their fertility is controversial as the exact risk of malignancy and recurrence risk remains unclear in literature.

Conclusion

Although Leiomyoma is a common presentation to the gynaecologist, a bizarre, symplastic leiomyoma is a rare histological diagnosis. Symplastic leiomyomas are benign and malignant transformation is rare, therefore the final treatment must be individualised, taking into account a patient's desire for fertility, co-morbidities and menopausal status. Multidisciplinary input is an important aspect of decision-making.

Consent of the patient: Obtained

Conflict of interest: None

Contribution of Authors: The 1st author wrote the case report and the co-authors reviewed it.

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CASE REPORT

Fusion of Permanent Maxillary Central and Lateral Incisor: A Rare Dental Anomaly

Kataki Rubi[1], Shekhawat Krutika[2], Bora Proxima[3], Bhuyan AC[4]

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ABSTRACT

Introduction: *Odontogenic anomalies of teeth can be encountered frequently in dental practise. Fusion and gemination are developmental dental anomalies leading to eruption of joined elements as double teeth. These anomalies pose a challenge even to the most experienced clinician in treating these teeth.* ***Aim****: Aim of this article is to throw light on a case of fused teeth which was esthetically rehabilitated.* ***Method:*** *Endodontic treatment followed by esthetic corrections.* ***Result:*** *Esthetically pleasing result.* ***Conclusion:*** *Its early interceptive treatment can help in avoiding severe pulpal and periodontal complications along with acceptable esthetic result.*

Keywords*: Developmental, abnormalities, esthetics, twinning.*

INTRODUCTION

Developmental dental disorders may be due to abnormalities in the differenciation of dental lamina and tooth germ or abnormalities in the formation of dental hard tissue. Odontogenic anomalies of number and forms may occur in primary and permanent dentition. These include germination, fusion and concrescence. The term double teeth, joined teeth, fused teeth, connoted teeth are often used to describe these anomalies. One of the most unusual anomalies of shape of the tooth is fusion.[1,2] The etiology of fusion is unknown. It could be hereditary or caused by physical forces acting on developing tooth germs. The purpose of this article is to present a rare case of unilateral fusion of central and lateral incisor.

CASE REPORT

A medically fit 29 year old male patient reported to the Department of Conservative Dentistry and Endodontics, Regional Dental College, Guwahati for esthetic management of fused teeth. There was no family history of dental anomalies and no consanguinity was reported in the parents. General and extraoral examinations appeared non-contributory. Intraoral examination revealed that maxillary left permanent central and lateral incisors were fused together (**Fig 1**). There was a deep groove on the labial and lingual surface with incisal notching. The periapical radiograph exhibited that the crowns and the roots were fused with complete union of their pulp chambers and root canals in maxillary left central and lateral incisors (**Fig 2**). Intentional root canal treatment was completed and periapical radiograph along with CBCT was taken for confirmation (**Fig 3**). Gingivectomy was performed labially and mesially to remove the fibrous band of tissue between the fused teeth and right central incisor. After gingivectomy distal part of the tooth was sectioned to the level of gingiva and crown preparation was carried out (**Fig 4**). Provisional restoration was planned for maintaining proper gingival contours. Cantilever bridge was then cemented with retentive arm on canine for retention (**Fig 5**).

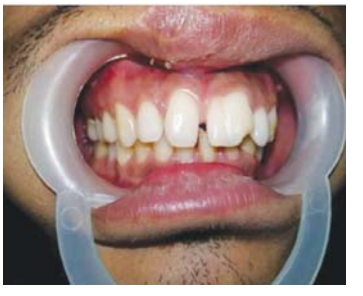

Figure 1 Pre-operative clinical photograph

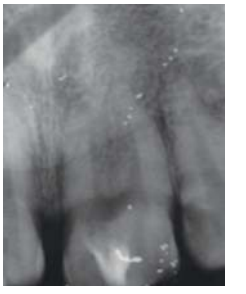

Figure 2 Pre-operative IOPA image

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Figure 3 CBCT and postoperative IOPA image

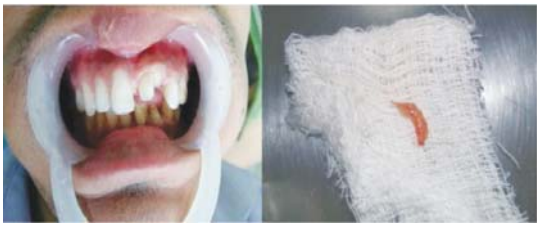

Figure 4 Crown preparation and piece of gingival tissue resected

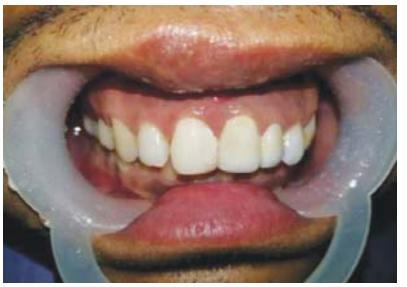

Figure 5 Postoperative clinical photograph

DISCUSSION

The terms "Twinning", "Joined tooth" or "Double tooth", is used to describe both fusion and germination.[3] Fused tooth due to the union of two separated tooth germs may be complete or incomplete tooth fusion depending on the time of union and stages of tooth development. It may be between two normal teeth or sometimes between normal tooth and supernumerary tooth germ.[1] In our reported case, fusion was seen between permanent maxillary central incisor and lateral incisor which is very rare. Depending on factors such as location of the connecting area, root-development stage, and patient age, treatment of fused teeth may vary.[4]

The etiology of fusion is still unknown; however, the crowding of the tooth germs during their development can be an important factor. Local metabolic disturbances or developmental aberrations of ectoderm and mesoderm during morpho-differentiation of tooth bud can be considered as etiological factors.[5] Genetic predisposition and racial differences have also been reported as contributing factors.[6] They do not show any sex predilection but are more frequent among Japanese population and American Indian.[7,8]

The number of teeth present is usually reduced in fusion, but is normal if the anomaly occur between a regular and supernumerary tooth. In contrast, gemination results in an apparent increase in the number of teeth[7,8] as they are caused due to the division of a single tooth germ to form two separate teeth. In these situations, differentiation from gemination is clinically difficult or impossible.

Fused and geminated teeth are asymptomatic but necessitate treatment when decayed. Even though there is no variation in the treatment plan, an attempt can be made to differentiate both the anomalies by performing a thorough clinical and radiographic examination. The mesiodistal width of fused teeth is greater than their adjacent normal dentition. Fusion between two teeth usually results in space gain or diastema but may not be the case when the anomaly involves a supernumerary tooth.

Cases of bilateral fusion are less frequent than unilateral fusion. The anomaly can cause unpleasant esthetic appearance due to irregular morphology. The buccal and lingual grooves may be deep and extend subgingivally favouring plaque accumulation leading to dental caries and periodontal diseases and may require endodontic intervention in some cases which may be complicated.[9,10,11,12] To create a pleasing smile with central and lateral incisor on left side of maxillary arch, the distal part of the fused tooth was sectioned to the gingival level and crown preparation was completed on the remaining mesial part of the fused tooth along with removal of the thick fibrous band of tissue on the labial and thick papilla on the mesial side of the fused teeth. Provisional restoration was luted maintaining the proper contour of gingiva followed by placement of an esthetic cantilever bridge comprising of central and lateral incisors.

CONCLUSION

In conclusion, fusions are rare developmental anomaly and need to be recorded during routine clinical examination. The abnormal morphology demands prophylactic and early interceptive treatment in order to avoid the complicated pulpal and periodontal treatment related to these teeth. The excellent esthetic and functional result obtained is presented here.

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CASE REPORT

Non-Surgical Endodontic Retreatment: A Ray of Hope

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ABSTRACT

***Introduction:** Endodontic failures can be attributed to inadequacies in shaping, cleaning and obturation, iatrogenic events, re-infection of the root canal system etc. Nonsurgical endodontic retreatment offers the patient a ray of hope to save a root canal treated tooth that would otherwise be destined for extraction. **Aim:** Nonsurgical endodontic retreatment. **Method:** Endodontic treatment with calcium hydroxide placement as an intracanal medicament. **Result:** Healing of the periapical lesions with successful resolution of signs and symptoms both clinically and radiographically. **Conclusion:** Nonsurgical endodontic retreatment procedures have enormous potential for success if proper guidelines for case selection are followed and the most relevant technologies, best materials and precise techniques are utilized.*

***Keywords:** Iatrogenic, Periapical lesion, Obturation, Intracanal medicament*

INTRODUCTION

Root canal system anatomy plays a significant role in endodontic success and failure.[1] There are many cases of failure of endodontic therapy. These cases include iatrogenic procedural errors (perforations, ledges, separation of instruments), missed canals, canals that are poorly shaped and obturated, overextrution of filling material as well as inadequate canal preparation and compaction of the root canal filling. In order to plan treatment effectively, the clinician must be aware of these etiologic factors which would otherwise lead to persistence of the pathogenesis. Endodontic failures must be evaluated so a decision can be made among nonsurgical retreatment, surgical retreatment, or extraction.[2,3] Surgical procedure can be a traumatic experience with many disadvantages like pain, edema, and other post-operative complications.

Nonsurgical endodontic therapy requires the need to regain access to the apical area of the root canal space in the previously treated tooth. Coronal access needs to be completed, all root canal fillings need to be removed, canal obstructions must be managed, and impediments to achieving full working length must be overcomed.[4] After that, all the principles of endodontic therapy apply to the completion of the retreatment case. Nonsurgical endodontic retreatment procedures have enormous potential for success if proper guidelines for case selection are followed and the most relevant technologies, best materials and precise techniques are utilized.[5-7] This article will focus on some clinical case reports that produced successful results in nonsurgical endodontic retreatment.

CASE REPORTS

CASE I

A 38 year old male patient reported to our department of Conservative Dentistry and Endodontics, Regional Dental College, Guwahati with pain and palatal swelling in relation to the upper right front teeth. Intraoral periapical radiograph (IOPA) revealed incomplete obturation and periapical radiolucency in relation to upper right front teeth (**Figure 1**). He gave history of trauma to the upper anterior teeth in a fall 4 years back. He had developed palatal swelling and undergone endodontic therapy. The patient remained asymptomatic till reappearance of the palatal swelling, which precipitated him to visit the hospital. The root canal systems of both the teeth were accessed and the old gutta percha removed (utilizing Gates Glidden drills, hand instrumentation with Hedstrom files and Canalsolv gutta-percha solvent). The canals yielded purulent fluid exudate. After one hour following drainage and irrigation, frank discharge subsided and the working lengths were determined for all three teeth both electronically and radiographically. The canals were prepared by a step-back technique with K-type files. Canals were intermittently

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and copiously irrigated with 2 ml of 3% sodium hypochlorite after each instrument change. Irrigation with NaOCl alternated with 17% EDTA solution is done during and after the instrumentation, to remove the smear layer. After chemomechanical preparation was completed, the canals were dried with sterile paper points and calcium hydroxide was introduced into the canal as an intracanal medicament and retained for 2 weeks. Finally, the root canals were obturated with gutta-percha and zinc oxide eugenol sealer using lateral compaction technique. Six months post-operative periapical radiographs reveals significant reduction in size of the periapical lesion and appearance of new trabecular pattern in the region (**Figure 2**).

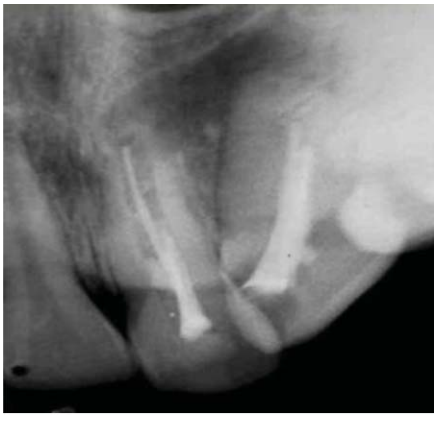

Figure 1 Preoperative radiograph

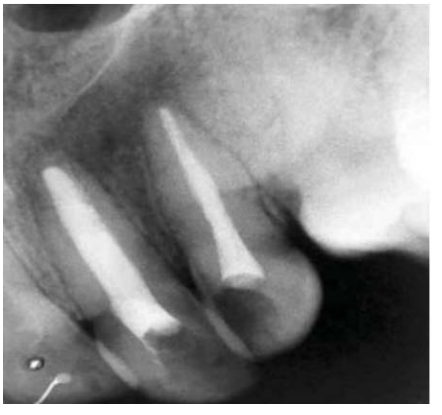

Figure 2 Post operative radiograph
Follow up after 6 months

CASE II

A 45-year-old male patient reported to the Department of Conservative Dentistry and Endodontics, Regional Dental College, Guwahati. IOPA confirmed that the patient had a deficient previous root canal treatment on the mandibular right first molar, with incomplete obturation with respect to both mesial and distal roots (**Figure 3**). The tooth was tender on percussion. Endodontic retreatment was planned. All the caries and the former coronal restoration material was removed from the pulp chamber along with the removal of remaining debris, sealer and gutta-percha from the root canals. The access cavity was refined and debridement was done after removing the gutta-purcha using canalsolv gutta-percha solvent and hedstorm files. The pulp chamber was thoroughly rinsed with 3% sodium hypochlorite solution. Working lengths were determined for all three teeth both electronically and radiographically. The canals were prepared initially using K files till no. 25 after which hand protaper files are used and prepared till F 2. Canals were intermittently and copiously irrigated with 2 ml of 3% sodium hypochlorite after each instrument change. Irrigation with NaOCl alternated with 17% EDTA solution is done during and after the instrumentation, to remove the smear layer. After completing cleaning and shaping of all the root canals, final irrigation with sodium hypochlorite, sterile saline and 2% chlorhexidine solution in each root canal was performed. The canals were dried with sterile paper points and an interim dressing of calcium hydroxide was placed as medication in each root canal for 2 weeks. In the second appointment, the calcium hydroxide dressing was removed. The canals were irrigated again and dried with sterile -paper points. Finally, the root canals were obturated with gutta-percha and zinc oxide eugenol sealer using lateral compaction technique. The permanent restoration of tooth was made with amalgam restoration. The patient was reviewed after 3 months, and no pathology was detected both radiologically and clinically (**Figure 4**).

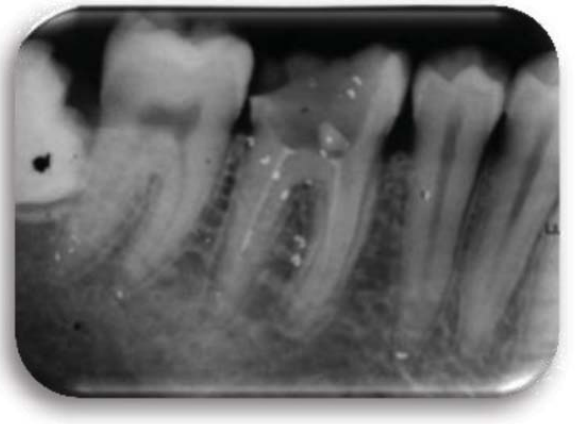

Figure 3 Preoperative radiograph

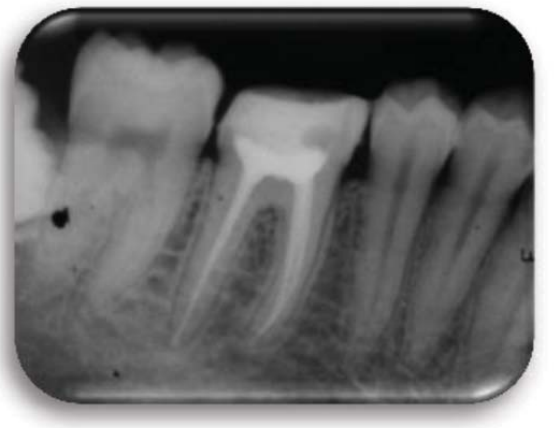

Figure 4 Post operative radiograph
Follow up after 3 months

DISCUSSION

For successful endodontic treatment thorough chemomechanical preparation followed by three dimensional obturation of the root canal system is required. Compromise at any of these steps can lead to failure of the treatment.[8,9] The two cases presented here were unsuccessful because of incomplete three dimensional sealing of the root canal system. Each of these cases required unique treatment considerations for achieving endodontic goal. Case I required an additional change of calcium hydroxide over a 2 week period before noting elimination of the patient's symptoms. Case II highlighted patient with long-standing symptoms with a long history of numerous repeated nonsurgical retreatment attempts.

Patients increasingly expect to retain their natural dentition and are often reluctant to have teeth extracted. Endodontic retreatment may offer the patient a second chance to save a root-treated tooth that would otherwise be destined for extraction. Many reports have shown a higher success rate when nonsurgical retreatment techniques are employed and, secondly, surgical success is significantly higher when it is preceded by a nonsurgical retreatment.[10] Anatomically, apical deltas are present in the apical two-thirds of root canal systems that may harbour bacteria and their toxins when the tooth has a nonvital pulp. If the remaining bacteria, their by-products and necrotic material are not removed by cleaning and shaping procedures they will be responsible for the persistence of the periapical lesion. In the cases presented above, calcium hydroxide was placed as intracanal medicament. Calcium hydroxide is indisputably the most appropriate intracanal medicament for teeth with periapical lesions, as it removes micro-organisms and promotes repair by controlling the inflammatory action (calcium proteinate bridge formation), neutralizing osteoclasts acid products (acid hydrolases and lactic acid), inducing cellular differentiation (alkaline phosphatase activation and calcium de-pendent ATPases) and neutralization of exotoxins.[11] Nonsurgical endodontic retreatment of the above mentioned cases are being performed to overcome the evasive surgical retreatment in terms of functional and psychological effect on patients.

CONCLUSION

Regardless of the enormous potential for endodontic success, certain teeth exhibit post-treatment disease. Nonsurgical endodontic retreatment, wherever feasible, with an emphasis on effective sealing of infected root canal should be better attempted. This article has identified successfully retreated endodontically failing teeth and verified the role of nonsurgical endodontic retreatment in preserving strategic teeth. Proper selection of cases and careful treatment planning sets the stage for a successful outcome.

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CASE REPORT

Direct Pulp Capping with Mineral Trioxide Aggregate -A Novel Material

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***Received** on January 12, 2017; **editorial approval** on May 21, 2017*

ABSTRACT

***Introduction:** Pulp capping in carious teeth has been considered unpredictable and therefore contraindicated. A recently developed material, mineral trioxide aggregate (MTA), resists bacterial leakage and may provide protection to the pulp, when used in combination with a sealed restoration. **Aim:** Aim of this case report was to determine the clinical and radiographic success rate of vital pulp therapy with mineral trioxide aggregate (MTA) in human mature permanent molar teeth. **Methods:** Carious pulpal exposure was treated by direct pulp capping with MTA. **Results:** After 9 months clinical and radiographic follow-up, it was found that the procedure had successful outcome. **Conclusion:**Although the results favoured the use of MTA in carious permanent teeth by vital pulp therapy but more studies with larger sample and a longer recall period are needed to justify the use of this novel material for treatment of reversible pulpitis in permanent teeth.*

***Keywords:** Caries, Vital, Remineralization, Preservation*

INTRODUCTION

Preservation and maintenance of pulpal vitality is one of the main objectives in Endodontics. Earlier, the placement of a medicament or material against a direct pulpal exposure during caries excavation has been considered controversial, and instead conventional endodontic therapy has been recommended.[1-5] A diagnosis of reversible pulpitis before treatment is necessary for a successful outcome, but a definitive pulpal diagnosis often is difficult to establish.[6] Success rates with direct pulp capping in a carious tooth have varied depending on the technique and materials. In humans, success rates range from 30 to 85 percent in two- to 10-year retrospective studies.[4,6-10]

MTA is a bioactive silicate cement that has been shown to be an effective pulp-capping material in canine models and in nonhuman primates.[11-13] The material is successful because of its small particle size, sealing ability, alkaline pH when set and slow release of calcium ions.[14] Investigators have reported that MTA induces pulpal cell proliferation[15], cytokine release[16], hard tissue formation[17] and the synthesis of an interface with dentin that resembles hydroxyapatite in composition.[14] The material is non-absorbable, sets in the presence of moisture, has a relatively high compressive strength and has a sustained high alkaline pH.[18]

CASE REPORT

The case concerned is a 15 years old female patient complaining of discomfort of tooth 36 upon contact with cold food, drinks and air. On examination, deep carious lesion was seen. The tooth tested vital to EPT and cold test (Endo-Frost, Roeko and Langeman, Germany) with no lingering pain and was negative on percussion. Radiograph showed evidence of deep caries in close proximity to the pulpal chamber with no evidence of thickened periodontal ligament (PDL) as shown in **Figure 1**.

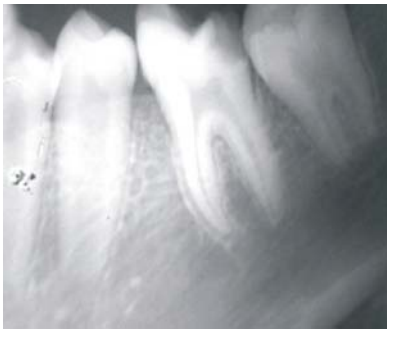

Figure 1 Preoperative Radiograph

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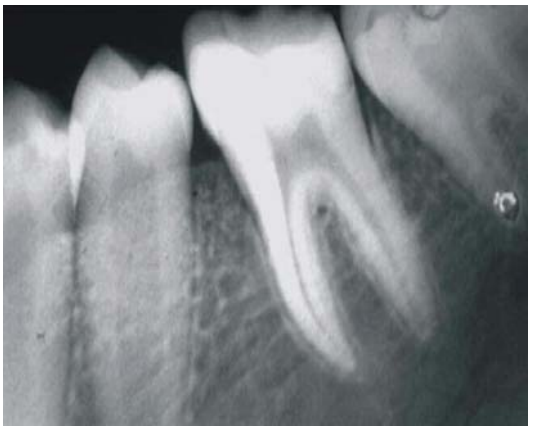

Figure 2 Post operative radiograph 9 months follow up

DISCUSSION

Although there was only one case, the results of this study in which we used MTA as a direct pulp-capping agent when following the protocol described for a two-visit sequence show that this procedure can achieve a long-term favourable outcome. The physical characteristics and bioactive properties of MTA were a critical contributing factor to the success of this study.[14-19] The cement is hygroscopic, and its ability to set is not affected by the presence of blood or serum fluids.[20]

Furthermore, the release of calcium ions by MTA generates a reactionary interfacial layer of hydroxyapatite on its surface when it comes in contact with tissue fluids, and their presence also may contribute to reparative dentin formation.[14] In our case we placed MTA over the exposure site and the entire floor or wall of the restoration preparation to allow a 1.5- to 3.0-mm thickness of the matter. The outcome shows that the human pulp has an innate healing capacity that can be enhanced using objective and conservative caries removal, a bioactive pulp-capping material and a sealed restoration. The high occurrence of pulpal repair and pulp-capping success appears to be more favorable in teeth of younger patients; success can be attributed to the presence of larger apical foramina and greater vascularization of the pulp, in which active immune cell surveillance may increase chances for repair and intensify vital pulpal maintenance.[9]

CONCLUSION

MTA promotes remineralization of dentine, preserves pulp vitality and promotes pulp healing. MTA has been identified as a revolutionary material which has the potential maintaining pulp vitality in patients judiciously selected for direct pulp capping. However further studies are required to extend the furtherscope of this material for clinical applications.

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CASE REPORT

A Rare Root Canal Configuration of Maxillary Lateral Incisor

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***Received** on March 26, 2017; **editorial approval** on May 30, 2017*

ABSTRACT

***Introduction**: A complete knowledge of root canal morphology is a mandatory for the endodontic therapy to be successful. **Aim**: The purpose of this article is to emphasize on the thorough knowledge of root canal anatomy. **Methods**: This case report describes the endodontic treatment of maxillary lateral incisor with three root canals which was confirmed using angulated radiographs(mesial and distal). **Results**: Maxillary lateral incisor with a three root canal configuration rarely reported in the literature. The tooth had one root with three root canals, one individual canal and two canals crossing at the apical third. This case report describes the successful endodontic retreatment of the maxillary left lateral incisors having combination of vertucci type I & type VII root canal morphological system. **Conclusion:** This case report describes the endodontic treatment of maxillary left lateral incisor with three root canals, with emphasis on rate of occurrence of multiple canals, and the importance of their identification and treatment.*

***Keywords:** Endodontic therapy, Radiograph, Unusual anatomy.*

INTRODUCTION

Successful endodontic therapy of a tooth demands that the dentist should have a thorough knowledge of the root canal morphology, making it mandatory towards thorough radiographic evaluation and diagnosis of the status of the pulp canals as well as the periapical areas.[1]Improper diagnostic protocol may lead to the failure of endodontic treatment. A wide morphological divergence of the root canal systems is known to exist. Maxillary lateral incisor is located in the location of high embryological risk with several anomalies of developmental origin like dens invaginatus, radicular grooves, and talon cusp and peg shaped.[2]

Varying number of the root canals in different teeth, their anatomy and interconnections have been studied and reported by several authors.[3-5] Vertucci has classified morphological patterns of the root canal systems into eight types.[6,7] Generally, the maxillary lateral incisors have one root canal with one apical foramen (Vertucci type I). However, the occurrence of three root canals with two separate foramina in the maxillary lateral incisors is very rare.

Funato A has reported a case with two root canals and separate apical foramina in the mandibular central incisor.[8] This case report describes the successful endodontic retreatment of the maxillary left lateral incisors having combination of vertucci type I & type VII root canal morphological system.[6,7] The case was followed up for period of six months. The striking feature of this report however was the presence of three root canals in maxillary lateral incisor teeth which has not been reported earlier to the best of our knowledge.

CASE REPORT

A 42 years old lady reported to the Department of Conservative and Endodontic Dentistry, Regional Dental College, Guwahati, with mild pain in the maxillary left lateral incisor since one year. On clinical examination, grade I mobility with discoloration with missing left central incisor has been seen. Radiograph shows periapical pathology in relation to left maxillary lateral with periodontal widening with missing left central incisor .Medical and family history was non-contributory.

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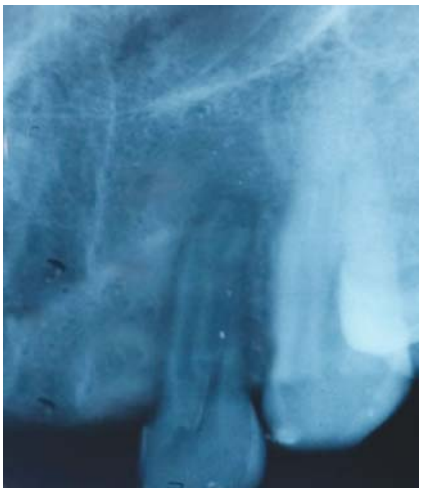

Figure 1 Pre-operative radiograph

A closer observation of the same radiograph revealed two root canals in 21, a rare morphological variation and in the second radiograph with different angulation revealed additional canal in 21 (Figure 2 & 3). The teeth were isolated with rubber dam and access was done by round bur followed by Endo Z bur (Dentsply maillefer).

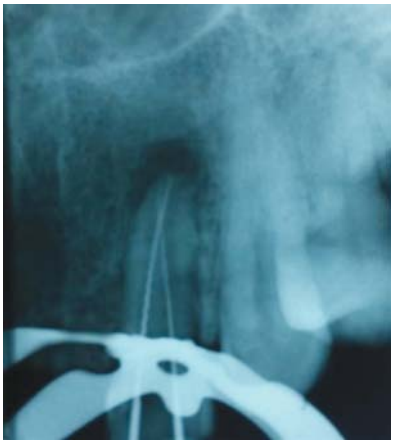

Figure 2 Mesial angulation radiograph

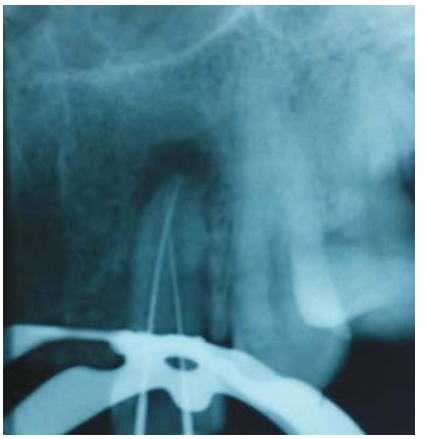

Figure 3 Distal angulation radiograph

Careful exploration of the root canals revealed three separate canals, two labially and one palatally has been found. Working length was established radiographically. The canals were prepared using a step back instrumentation technique upto K file number 55 # instruments. A 2% of chlorhexidine and normal saline were alternatively used as irrigants at every change of instruments.

The canals were dried with sterile paper points and were dressed with calcium hydroxide paste (Pulpdent). The access cavities were then temporarily sealed with cavitemp (Ammdent). At 2 weeks follow up as the teeth were asymptomatic, obturation of the root canals were under taken with laterally condensed gutta-percha using lateral condensation technique (Figure 4). Post obturation radiograph was taken and the access cavities were sealed with IRM. The patient was followed up at regular interval of 1, 3 and 6 months respectively. At 6 months follow up; complete resolution of the periapical pathology was observed).

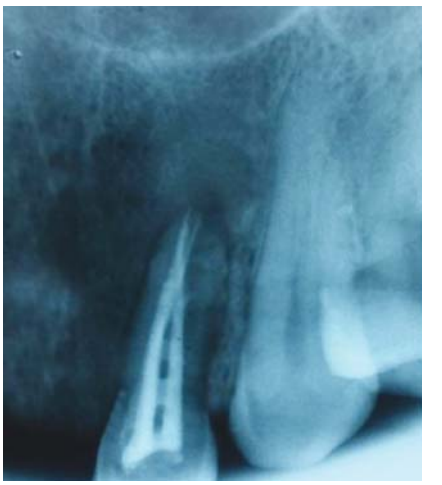

Figure 4 Post obturation radiograph

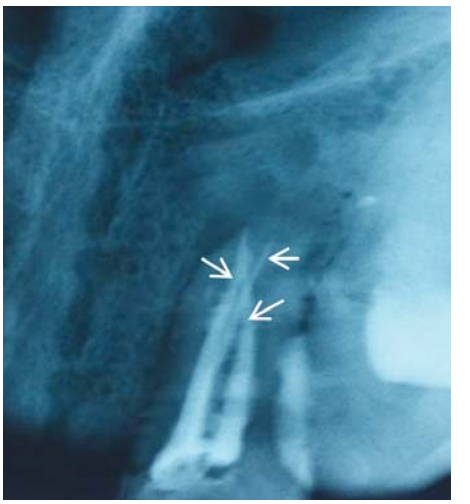

Figure 5 6month follow up radiograph

DISCUSSION

Overall success of the endodontic treatment is directly dependent on thorough debridement of the root canals and hermetic seal of the obturated materials, thus proper preoperative radiographic evaluation is necessary.

The anatomy of root canal systems dictates the condition under which root canal therapy is carried out and can directly affect its prognosis. Extra root or root canals if not detected are a major reason for failure of this treatment.[9]

]Incomplete removal of all the irritants from the pulp space may increase the possibility of treatment failure.[10,11] The main reasons for failure in endodontic treatment of incisors is the inability to detect the presence of a extra root canal, which can then not be prepared and obturated during treatment.[12]

In present case, three root canals with two separate foramina were distinctly observed in the maxillary left lateral incisor. Numerous antimicrobial agents have been recommended as inter appointment dressings.[13] Calcium hydroxide paste is a simple and remarkably effective antimicrobial medicament. It has been shown to dissolve necrotic tissue.[14] In the present case, calcium hydroxide (Pulpdent) was used as the intra-canal medicament. At 15 days recall teeth were asymptomatic and thus taken up obturation.

CONCLUSION

Careful radiographic examination of the root canal system is important prior to the root canal preparation, so as to detect and be aware of variations in root canal anatomy, before and during endodontic treatment procedures. Finally, it is also important that the endodontic treatment be reviewed periodically to ensure continuous healing without complications.

Conflicts of interest: No conflict of interest.

Contribution of Authors: "We declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors."

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"IJHRMLP Life Time Achievement Award" for the year 2016 to Prof. Nirmal Ch. Bhattacharyya, former Principal cum Chief Superintendent of Tezpur Medical College & Hospital.

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Inaugural ceremony of XIV National Conference of Hospital Infection Society of India (HISICON 2017) held from 9th to 11th February 2017 at GMCH Auditorium organized by Hospital Infection Society, Guwahati Chapter, Assam and Department of Microbiology, Gauhati Medical College, Guwahati in association with HISI India

Inaugural ceremony of XXXVIII Annual National Conference of Indian Academy of Forensic Medicine held from 23rd, 24th and 24th February, 2017 at IIT, Mumbai

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